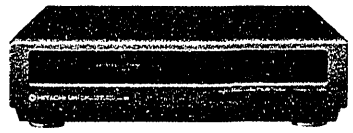
# HITACHI

# SERVICE MANUAL

TK | No. 3263E

**VT-M140A/M141A**
**VT-M140AW**
**VT-M131A**



*Technical Data*

## SPECIFICATIONS

| | |
|---|---|
| Recording: | Rotary two head Helical Scan Azimuth Recording |
| Video: | NTSC Color EIA Standard |
| Cassette: | VHS Type |
| Heads: | 2 video heads<br>1 Full track audio/video erase head<br>1 Combination head for control track, audio erase and audio record/play (3 heads/single housing) |
| Tape Speed: | 33.35 mm/sec (SP), 16.67 mm/sec (LP), 11.12 mm/sec (EP) |
| Tape Width: | 12.7 mm |
| RF Output: | Channel 3 or Channel 4 |
| RF Input: | UHF/VHF 75 ohm |
| Tuning Range: | VHF LOW CH, 2 ~ 6 (54 MHz – 88 MHz)<br>VHF MID CH, A-5 ~ A-1 and A ~ I (90 MHz – 174 MHz) CATV<br>VHF HIGH CH, 7 ~ 13 (174 MHz – 216 MHz)<br>VHF SUPER CH, J ~ W (216 MHz – 300 MHz) CATV<br>VHF HYPER CH, W+1 ~ W+28 (300 MHz – 468 MHz) CATV<br>UHF CH, 14 ~ 69, W+29 ~ W+84 (470 MHz – 806 MHz) |
| Video Input: | 1 – 2 Vp-p 75 ohm Unbalanced |
| Video Output: | 1 Vp-p 75 ohm Unbalanced |
| Audio Input: | 316 mV rms (–7.8 dB) 100 kohm |
| Audio Output: | 316 mV rms (–7.8 dB) 600 ohm |
| Video Recording S/N: | Better than 46 dB (SP), Better than 43 dB (LP), Better than 40 dB (EP) |
| Horizontal Resolution: | 240 lines (SP), 230 lines (LP), 230 lines (EP) |
| Audio Response: | 50 Hz – 10 kHz (SP), 50 Hz – 7 kHz (LP), 100 Hz – 6 kHz (EP) |
| Audio S/N: | Better than 43 dB (SP), Better than 40 dB (LP), Better than 40 dB (EP) |
| Power Input: | AC 120V 60 Hz |
| Power Consumption: | 23W Nominal |
| Cabinet Size: | 14-9/16"(W) x 3-1/2"(H) x 12-5/8"(D)<br>37.0(W) x 8.9(H) x 32.0(D) cm |
| Weight: | 11.7 lbs (5.3 kg) |
| Accessories: | 1 – Coaxial cable<br>1 – Remote control unit<br>2 – Batteries |

Design and Specifications subject to change without notice.

VHS

This video deck is a VHS type video recorder. For proper operation, only the VHS type cassette must be used.

Manuals related to the VT-M140A/M141A/M140AW/M131A

| Name of Manual | Language | Manual No. | Chapters included |
|---|---|---|---|
| Technical Data | English | 3263E | CHAPTER 1.2.3.5.6 |
| | French | 3269F | CHAPTER 3 |
| | English | 3265E | CHAPTER 2 (MACHA DIS).4 |
| | French | 3270F | CHAPTER 4 |
| Technical Information | English | 3264E | ---- |

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

# VIDEO CASSETTE RECORDER

May 1990 TOKAI WORKS

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## SAFETY PRECAUTIONS

**NOTICE:** Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis.

1. When replacing a chassis in the instrument, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment covers/shields, isolation resistors/capacitors, etc.
2. When service is required, observe the original lead-dress. Extra precautions should be taken to assure correct lead dress in the high voltage circuit.
3. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacturer's. Furthermore, where a short-circuit has occurred, replace those components that indicate evidence of overheating.
4. Before returning an instrument to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective or inadvertently defeated during servicing.

Therefore, the following checks should be performed for the continued protection of the customer and service technician.

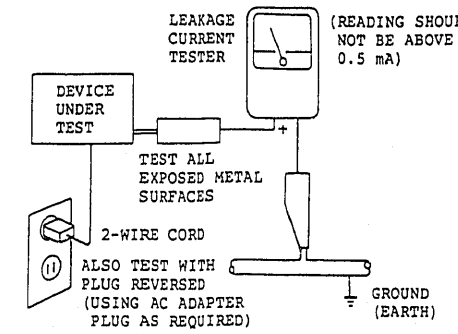
**Leakage Current Cold Check**

With the AC plug removed from the AC120V, 60Hz source, place a jumper across the two plug prongs. Turns the AC power switch on. Using an insulation tester (DC500V), connect one lead to the jumpered AC plug and touch the other lead to exposed metal parts (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3 Mohm and a maximum resistor reading of 5 Mohm. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

**Leakage Current Hot Check**

Plug the AC line cord directly into a AC120V, 60 Hz outlet (do not use an isolation transformer for this check).

Turn the AC power switch on. Using a "Leakage Current Tester", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shaft, etc.), particularly an exposed metal part having a return path to the chassis, to a known ground (earth) (water pipe, conduit, etc.). Any current measured must not exceed 0.5 mA.


LEAKAGE CURRENT TESTER
(READING SHOULD NOT BE ABOVE 0.5 mA)
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
GROUND (EARTH)

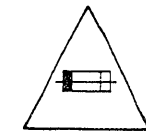
AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

**PRODUCT SAFETY NOTICE**

Many electrical and mechanical parts have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.
Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.
The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.
Product safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

CAUTION AGAINST FUSE REPLACEMENT



CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE AMPERE, VOLT FUSE.
ATTENTION : AFIN D'ASSURER UNE PROTECTION PERMANENTE CONTRE LES RISQUES D'INCENDIE, REMPLACER UNIQUEMENT PAR UN FUSIBLE DE MEME TYPE ET DE AMPERES VOLTS.

This symbol indicates Fast Operating Type Fuse.

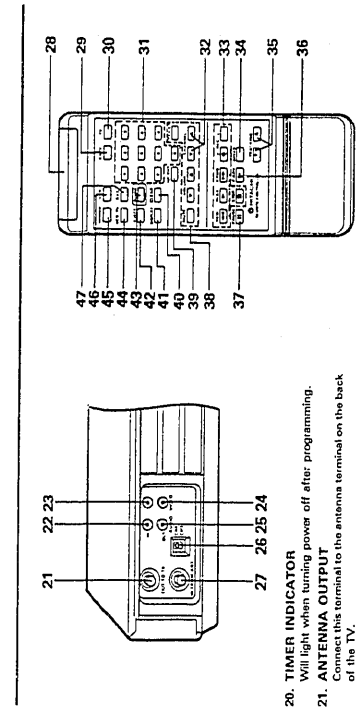
## COMPARISON WITH PREVIOUS MODEL

| | ITEM | | VT-M12XA | VT-M140A/M141A/M140AW |
|---|---|---|---|---|
| FEATURES | HQ (HIGH QUALITY) | | USED | USED |
| | COMB FILTER | | USED | USED |
| | NUMBER OF CHANNELS | | 155 CH | 181 CH |
| | CHANNEL PRESET | | F.S. AUTO TUNING | F.S. AUTO TUNING |
| | CHANNEL SELECT | | UP/DOWN / 10-KEY | UP/DOWN / 10-KEY |
| | CATV/NOR. SELECT (REMOTE) | | YES | YES |
| | TIMER REC PROGRAM | | 4 PROGRAMS/1 YEAR | 8 PROGRAMS/1 YEAR |
| | TIMER BACK-UP | | ABOUT 5 SECONDS | ABOUT 5 SECONDS |
| | MODE DISPALY | | OSD/FL DISPLAY | OSD/FL DISPLAY |
| | TIMER PROGRAMMING | | OSD (BY REMOTE CONTROL) | OSD (BY REMOTE CONTROL) |
| | CHANNEL TUNING | | REMOTE CONTROL | REMOTE CONTROL |
| | CLOCK SETTING | | OSD (BY REMOTE CONTROL) | OSD (BY REMOTE CONTROL) |
| | TV SELECT BUTTON | | YES (BY REMOTE CONTROL) | YES (BY REMOTE CONTROL) |
| | UHF ANTENNA TERMINAL | | PROVIDED | NOT PROVIDED |
| | IRT START BUTTON | | NO | NO |
| | IRT LENGTH BUTTON | | YES | YES |
| | COUNTER DISPLAY | | OSD | OSD |
| | SCANAPLAY INDEX | | NO | NO |
| | A/V INPUT SELECTOR | | NO (JACK TERMINAL) | YES |
| | PICTURE CONTROL | | NO | NO |
| | INTELASCAN GUIDE | | NO | YES |
| CHASSIS | BASIC CHASSIS TYPE | | PZ | PZ |
| | VIDEO HEADS | | 2 HEADS<br>SP, LP, EP: 30$\mu$m | 2 HEADS<br>SP, LP, EP: 30$\mu$m |
| MAIN CONTROL ICS | VIDEO | LUMINANCE PROCESS | HT4947C (IC201) | HT7225 (IC201) HT7025F(IC201) (M140AW ONLY) |
| | | CHROMA PROCESS | HA11810BNT (IC202) | |
| | | CCD 1H DELAY | MSM7400RS (IC203) | MSM7400RS (IC203) |
| | AUDIO | AUDIO AMP | LA7297 (IC401) | LA7297 (IC401) |
| | SERVO | PHASE/SPEED CONT. | HD49747NT (IC601) | HD49747NT (IC601) |
| | | C.FG COMPARATOR | BA6993 (IC602) | BA6993 (IC602) |
| | | CYLINDER MOTER DRIVE | BA6459P (IC1651) | XRA6459P (IC1651) |
| | TIMER/SYS-CON. | MAIN UP | CXP5058 (IC751) | CXP50116 (IC751) |
| | | LOADING MOTER DRIVE | BA6209U4 (IC753) | BA6209U4 (IC753) |
| | | RESET | S8053-ALB (IC755) | PST529i (IC755) |
| | OSD | OSD UP | MB90062-106 (IC1401) | $\mu$PD6450C-703 (IC1401) |
| | PUWER SUPPLY | 5V REGULATOR | RC78M05E (IC204) | — |
| | | 5V REGULATOR | LM340CT2 (IC861) | — |
| | | 5V REGULATOR | M5F7805 (IC864) | M5F7805 (IC804) |

※ Model VT-M131A was produced by changing the VT-M140A as follows.

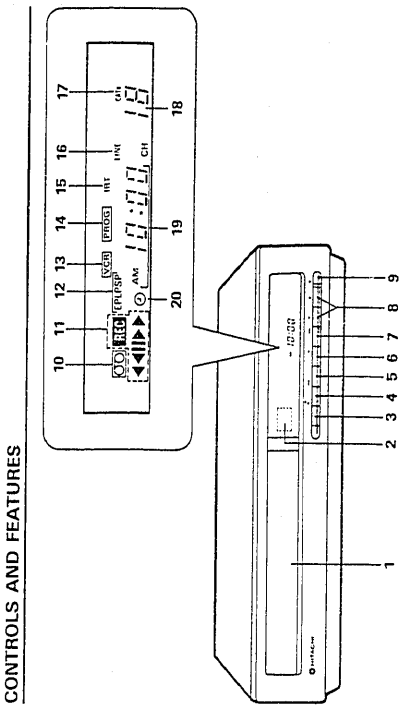
- Auto head cleaning mechanism omitted
- Insulators omitted
- Remote control changed






20. **TIMER INDICATOR**
Will light when turning power off after programming.
21. **ANTENNA OUTPUT**
Connect this terminal to the antenna terminal on the back of the TV.
22. **AUDIO IN**
Receive audio signals from a stereo system or another VCR.
23. **VIDEO IN**
Receives video signal from a video camera or another VCR.
24. **VIDEO OUT**
For connection to monitor TV.
25. **AUDIO OUT**
For a connection to a monitor or another VCR.
26. **RF CONVERTER SWITCH**
Set this switch to whichever channel (CH3 or CH4) is unused in your area.
27. **ANTENNA INPUT**
Connect the UHF and/or VHF antenna to this terminal.
28. **SIGNAL TRANSMISSION WINDOW**
Transmits an invisible light beam (infrared) from the remote control unit to the VCR.
29. **CATV BUTTON**
First press this button when operating your Cable Converter with this remote control, and then press the button which corresponds to the function you want.
30. **TV BUTTON**
First press this button when operating your TV with this remote control, and then press the button which corresponds to the function you want.
31. **NUMBER BUTTONS "0" THROUGH "9"**
Select any channel (whether or not it is in the "Tuner Scan List") by pressing two buttons. (Press "0" and then "8" for channel 8.) The number buttons are also used for setting the clock and programming the timer.
32. **CHANNEL SELECT BUTTONS**
Same as the buttons on the VCR.
33. **VCR CONTROL BUTTONS**
These buttons (except for "REC" buttons) function same as the buttons on your VCR.
Note: The REC buttons must be pressed simultaneously to start recording.
34. **TAPE SPEED SELECT BUTTON**
Recording time using cassette tape T-160.
EP: 8 hours LP: 6 hours SP: 2 hours
Note: Playback speed automatically corresponds with recorded speed.
35. **TRACKING CONTROL BUTTONS**
To minimize noise in playback. May also be used during visual search to move the noise bars up or down on the screen.
36. **FRAME ADVANCE BUTTON**
Press to view tape one frame at a time.
Operates only after PAUSE button has been pressed.
37. **PAUSE BUTTON**
Press to pause during recording or playback.
38. **TV CONTROL BUTTONS**
Used for controlling the TV.
You need not press the TV button before pressing these buttons.
39. **100/ENT BUTTON**
Used to select TV channels.
Press "100", "2", "3" in this order to select channel 123.
Press "100", "0" and "5" for channel 105.
40. **CLEAR BUTTON**
Used for programming the timer.
And also used for counter reset button.
41. **DISPLAY BUTTON**
**1st Press** .... Calls up the mode display on TV screen.
**2nd Press** .... Defeats the display function. Useful to prevent recording the On-Screen-Display. Also changes the VCR's display from the clock to the tape counter.
**3rd Press** .... Does not change the display on the TV screen at all. Changes the VCR's display from the counter to the clock.
42. **EJECT BUTTON**
When this button is pressed in modes other than recording, the tape stops, and the cassette is ejected.

## CONTROLS AND FEATURES




1. **CASSETTE COMPARTMENT**
Insert a cassette in through a door, and loading will be completed automatically.
Note: Power is turned on automatically when the cassette is loaded.
2. **INFRARED RAY RECEIVING SECTION**
Receives the infrared ray from remote control unit.
3. **POWER BUTTON**
Turn system power on and off.
4. **STOP/EJECT BUTTON**
If this button is pressed, while the set is operating, the running of tape stops and all operating modes are cancelled (except for timer recording). The cassette is ejected, when this button is pressed again in STOP mode.
Note: Power may be on or off when removing the cassette.
5. **REWIND/VISUAL SEARCH BUTTON**
Press to start rewind.
Press this button during playback, and reverse playback picture at high speed can be seen.
6. **PLAY BUTTON**
Press to start play.
Note: When the cassette (with erase prevention tab removed) is loaded, playback starts automatically.
7. **FAST FORWARD/VISUAL SEARCH BUTTON**
Press to activate fast forward.
Press this button during playback, and forward playback picture at high speed can be seen.
8. **CHANNEL SELECT BUTTONS**
Select the channels you wish to view or to record by pressing these buttons.
And you can also select "LINE" by pressing these buttons to record or watch the program input at the VIDEO IN and AUDIO IN.
("One channel position either higher or lower outside the range of your preset channels.)
9. **RECORD/IRT BUTTON**
Press to start recording.
10. **TAPE-IN INDICATOR**
Lights when cassette is loaded in the compartment.
11. **VCR MODE INDICATOR**
- [REC] appears during recording.
- ◁◁ appears during the rewind mode.
- ▷▷ appears during the fast-forward mode.
- ▷ appears during the playback.
- ▯▯ appears when the PAUSE button is pressed during record or play mode and disappears when the PAUSE button is pressed again.

12. **TAPE SPEED INDICATORS**
13. **[VCR] INDICATOR**
Appears when the VCR is turned on or the VCR is in the playback mode.
14. **[PROG] INDICATOR**
Lights if any program is in the timer.
15. **IRT INDICATOR**
Lights during programming the IRT program and after programming.
16. **LINE INDICATOR**
Lights when you select the LINE position by pressing the AVX button or CHANNEL select button. LINE position is used to record or watch the program input at the VIDEO IN and AUDIO IN.
17. **CATV INDICATOR**
"CATV" appears in the display when viewing or recording CATV channels. "CATV" disappears from the display when viewing or recording NORMAL channels. See page 18 for details.
18. **CHANNEL INDICATOR**
19. **CLOCK DISPLAY**
Shows the clock and tape counter.

**43. INTELASCAN GUIDE BUTTON**
Press this button to use the Intelascan feature. (See page 2 for details.)

**44. VCR/TV SELECT BUTTON**
Selects the signal to be viewed.
The VCR indicator comes on when the unit is in VCR mode and the signal received by the VCR is displayed on the TV screen. With the switch in the TV position (indicator light off) the broadcast signal is received directly by your TV set. When the VCR power is turned off, the VCR automatically switches to "TV".

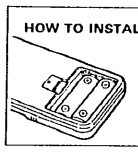
**45. POWER BUTTON**
Press to turn VCR on. Press again to turn VCR off.

**46. VCR BUTTON**
First press this button when operating the VCR with this remote control and then press the button which corresponds to the function you want.

**47. AVX BUTTON**
Press to select tuner position to record or view an off-the-air TV program (through the VCR's built-in tuner) or the "LINE" position to record or view the program input through the video and audio line input jacks.

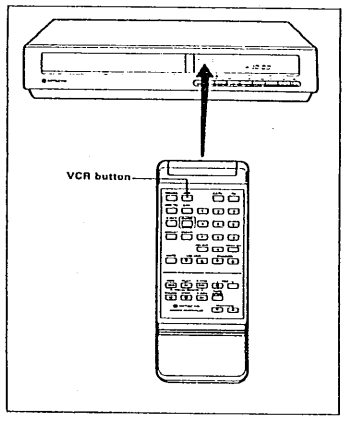
## ■ USING THE REMOTE CONTROL UNIT

**HOW TO INSTALL BATTERIES**



**NOTES:**
1. Be sure to install two "AA" size batteries before use.
2. Be aware of the polarity.

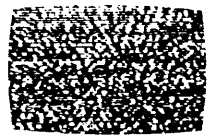
Aim the remote control at the receiver on the front panel of the VCR.




**NOTES:**
1. If the range is short, try new batteries.
2. An object in between the VCR and remote control unit may block the invisible light beam and operation will not be possible.
3. If you cannot operate the VCR with this remote control, first press the VCR button and then press the button which corresponds to the VCR function you want.

## HEAD CLEANING (Not used M131A)

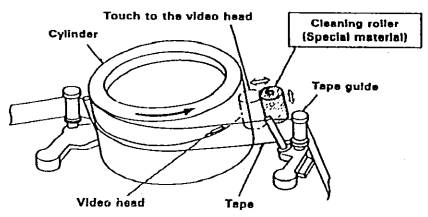
- Picture playback may become blurred or be interrupted while the TV program received is clear. This does not mean that the recorded program has been erased. (See figure below.)
- Dirt accumulated on the head after long periods of use causes this problem. Since this VCR uses an auto head cleaning system, dirt does not often adhere to the heads.
  When it is difficult to remove dirt using this system, head cleaning requiring highly technical care is necessary.
- Video heads rotate rapidly and are easily damaged if they contact objects other than video tape. Under most conditions, they tend to be self cleaning due to contact with the tape. If the video heads become dirty, the picture will become snowy. Only when the picture becomes snowy and the tracking control has no effect, should the heads be cleaned.
  Head Cleaning Cassettes are available in the marketplace for customer use, but the quality and effectiveness of these Cleaning Cassettes ranges from satisfactory to poor. Some cleaning cassettes increase head wear or cause damage to the video heads. Others may become stuck in the machine.
  We recommend that head cleaning be performed only by qualified video recorder technicians. Head cleaning or malfunctions caused by head cleaning is not covered by the Limited Warranty.



Example of playback with dirty video heads

**Auto Head Cleaning System**

This system cleans the video heads automatically when recording or playback starts and finishes to prevent dirt from accumulating on the heads.
**NOTE:** Mechanical sound is heard during head cleaning.



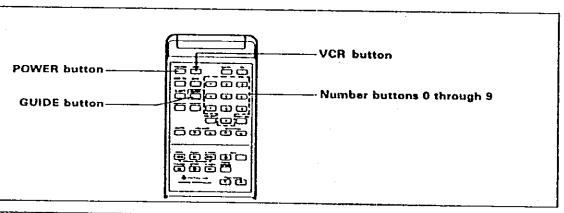

## PERIODIC MAINTENANCE

The VCR is a precision electromechanical device which will require periodic maintenance after a period of normal use. We expect that no maintenance other than head cleaning will be required during the warranty period by most users, unless the VCR is heavily used or seldom used. Normal maintenance is the responsibility of the user, although defective parts are covered during the warranty period. Consult your VCR Service Center to determine recommendations for normal maintenance based on your location, use patterns and machine age.

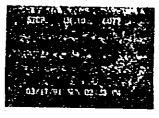
## SETTING THE CLOCK

**Things to know before starting**

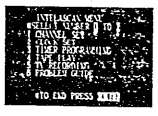
- The clock uses the 12-hour system. (Be aware of AM and PM.)
- When you first plug in your VCR, the clock will read "– – : – –".
- The Buttons for setting the clock are on the remote control unit.
- While you are setting the clock, the "menu" display on the TV screen will prompt you through the procedures.
- If you press a wrong digit, press the CLEAR button repeatedly until the digit to be corrected flashes and then enter the correct digit.




1. Turn on the power of both VCR and TV.
2. Be sure that the TV is set to the video channel (channel 3 or 4).
3. Aim the remote control unit at the receiver on the front panel of the VCR.



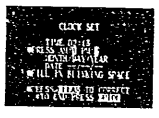
4. Press the GUIDE button on the remote control unit until the "MENU", as illustrated, appears on the TV screen.
   **NOTE:** If the menu does not appear when the GUIDE button is pressed, press the VCR button and then the GUIDE button.



Original menu

5. Press "2" button to set the clock. The display prompts you to set the hour.

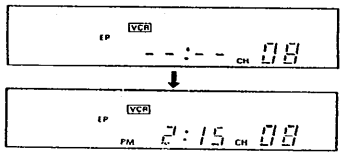
6. Set the hour by pressing two number buttons on the remote control unit and two more for the minute (for example, 0 2 1 5 for 2:15). The display prompts you to select AM or PM.



7. Press "1" for AM or "2" for PM. The display flashes and prompts you to set the date.

8. Set the date by pressing six digits in order of month, day and year (for example, 0 3 1 7 9 1 for March 17, 1991). The day of the week will appear when you have entered all six digits for the date.
   **NOTE:** Always press "0" before single-digit months and days.

9. Press GUIDE button to start the clock. The display resumes the "original menu".
   **NOTE:** Now the display on the VCR will show the correct time.

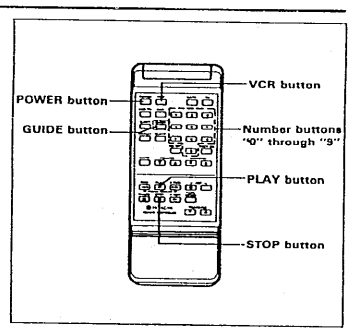



10. Press GUIDE button once again to return to the TV screen.

**NOTES:**
1. If you input an illogical time or date (13th month for example), this will not be accepted .
2. The clock must be set to the correct time before programming the timer for unattended recording or using the Instant Recording Timer (IRT) feature.
3. The display of Clock Setting procedures will resume the "original menu" if not further steps are followed in the setting for about 1 minute.
4. If power is interrupted for more than 5 seconds, "– – : – –" will appear on the display and Timer and Programming will need to be reset.

## CHANNEL TUNING

The automatic programming feature makes it easy and convenient to program the TV station into the tuner's memory.
Automatic programming is usually a "one-time" procedure, but you will need to repeat it if you move to a location that has different channels.




1. Turn on the power of both VCR and TV.
2. Be sure that the TV is set to the video channel (channel 3 or 4).
3. Aim the remote control unit at the receiver on the front panel of the VCR.

4. Press the GUIDE button on the remote control unit until the "MENU", as illustrated, appears on the TV screen.
   **NOTE:** If the menu does not appear when the GUIDE button is pressed, press the VCR button and then the GUIDE button.

**Original menu**

5. Press button "1" for channel setting. The channel setting "MENU" appears on the TV screen.

6. Press button "1" to select "NORMAL" or "CATV".
   If your VCR is connected to a home antenna system, select "NORMAL"; select "CATV" when your VCR is connected to a cable antenna. Switching is performed between "NORMAL" and "CATV" on the TV screen every time button "1" is pressed. If you select "CATV", "CATV" appears in the VCR display, and if you select "NORMAL", "CATV" disappears.

7. Press "2" button.
   The tuner will automatically cycle through all available channels in the area and place them in the tuner's memory. It takes about 50 seconds.
   The channel number will stop changing when the tuner is finished cycling. Programming is now completed. You can select the active channels by pressing the CHANNEL select buttons.

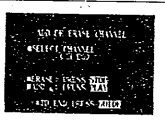
### ■ Eliminating unwanted preset channels

You may want to have only a few favorite channels in the tuner's memory so you can select them more quickly with the CHANNEL select button.
Occasionally automatic programming may include a vacant channel in the tuner's memory if there happened to be some sort of "noise" or "stray signal" on the channel when the tuner was programmed. This procedure explains how to delete any unwanted channels from the tuner's memory.

1. Follow steps 1 through 5 of "Channel Tuning"
   The channel tuning "menu" appears on the TV screen.

2. Press "3". The "menu", as illustrated, will appear on the TV screen.

3. Select the channel number by pressing buttons "0" through "9". (Press "0" and then "8" for channel 8.)
   Press the PLAY button to add channels and the STOP button to erase channels.
   Perform the same procedure to add or erase other channel numbers.
   **NOTE:** Erased channels cannot be selected by the CHANNEL button, but can be selected by buttons "0" through "9".



**NOTE:** If you view and record one or more local UHF channels that your cable system does not offer, first, program the cable-TV channels. Then preset the desired UHF channels by following the "Adding channels to the tuner's memory" after selecting the "NORMAL".

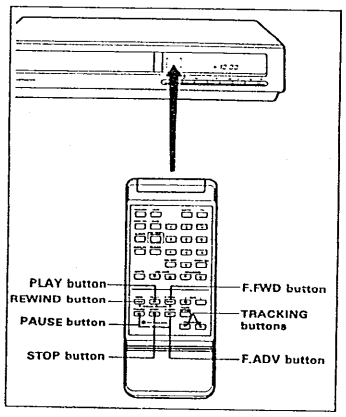
### ■ Adding channels to the tuner's memory

You may have deleted a channel from the tuner's memory and want to put it back. Occasionally automatic programming may "miss" an active channel because the signal is very weak or because the channel happened to be "off the air" when the tuner was programmed. Use this procedure to add any channel in the memory.

Your VCR is capable of receiving "off-the-air" TV channels (VHF 02 — 13, UHF 14 — 69) and CATV channels 01 — 125, a total of 181 channels*.

* You can receive channels 02 — 13 on both "off-the-air" and "cable" channels. Therefore, the total number of channels including "off-the-air" and "cable" channels is 181 channels (12 + 56 + 125 — 12 = 181).

## PLAYBACK




1. Insert the cassette.
   VCR power is turned on automatically.
   **Note:** When the cassette (with erase prevention tab removed) is loaded, the playback starts automatically.
2. Turn the TV on and select the video channel.
3. Press the PLAY button.
4. Press the STOP button to stop playback.

**Tracking control adjustment**
When playing prerecorded tapes or those recorded on units other than your own, black and white streaks may appear on your TV screen. If this occurs, press either TRACKING control button (▼ or ▲) until the streaks disappear.

**Still playback**
When the PAUSE button is pressed during playback, a still picture can be seen. To start again press PAUSE button and the VCR will continue playback.

**Notes:**
- There will be some noise (interference) in the still pictures.
- When the still mode continues for about more than 5 minutes, the VCR will automatically change to stop mode to protect the tape.
- If vertical jitter (shaking) occurs during the still mode, press either TRACKING control button (▲ or ▼) (one by one) to minimize it.

**Frame Advance**
When you press F.ADV button on the remote control unit during Still (play-pause) mode, one frame at a time can be seen.
Operates only after PAUSE button has been pressed.

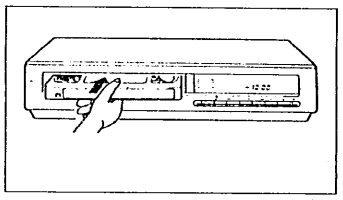
**Visual search**
This allows you to view the picture from a recorded tape at high speed in both the forward and reverse directions.
Press the PLAY button to play a tape, then press either the VISUAL SEARCH button REW or F.FWD. Pictures can be viewed at high speed in either the forward or reverse direction.
Press the button again (or press PLAY) to return to normal playback.
**Note:** The playback picture will have some noise in the visual search mode.

**Automatic rewind**
The tape will stop and automatically rewind when the end of the tape is reached.
This function does not operate during timer recording and instant recording.

**Rewind shut off**
If power button is pressed during rewind operation, power will be turned off automatically after the tape has been completely rewound.

## TIMER RECORDING

The programmable electronic clock/timer permits the unattended recording of up to 8 preselected programs, including one program on the same day of each week or one program at the same time every day.
It can be preset up to 1 year in advance to record your favorite programs. It turns the unit on and off and changes channels automatically.



1. Insert the Cassette.
2. Press the SPEED button to select "SP", "LP" or "EP".
3. Set the program timer.
   "START (ON) TIME", "STOP (OFF) TIME", "DAY" etc. See below.
4. Turn power off. Now recording will begin automatically at the start time.

**Notes:**
- It is not necessary to press RECORD button.
- The TIMER indicator flashes to warn that recording will not occur because cassette has not been inserted. If the safety tab on the cassette has been removed, the VCR will automatically eject the cassette when placed in the Timer mode.

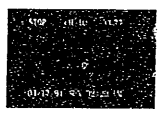
### ■ Programming the timer for unattended recording

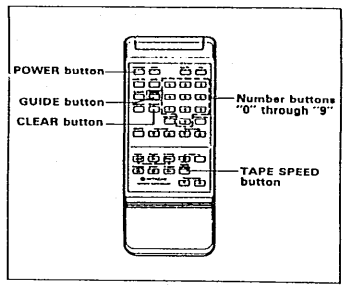
For unattended recording the timer needs to know what day to make the recording, the time to start, the time to stop, and the channel to be recorded.

**Things to know before starting**

- While you are programming the timer, the "menu" display on the TV screen will prompt you through the procedures.
- You can correct an error in the program any time before the last step by pressing CLEAR button repeatedly until the digit to be corrected becomes flashing and then enter the correct digit.
- The programming will automatically resume the "original menu" if no further steps are followed in programming for about 1 minute.
- The "original menu" will be switched to the TV screen automatically if it is left on without further steps for about 1 minute.

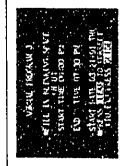
1. Turn on the power of both VCR and TV.
2. Be sure that the TV is set to the video channel (channel 3 or 4).
3. Aim the remote control unit at the receiver on the front panel of the VCR.



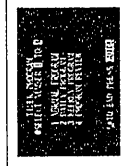


10. Press four digits, two for the hour and two more for the minute (for example, "0" "7" "3" "0" for 7:30). The display will prompt you to select the date.

11. Press four digits (two for the month and two for the day) (for example, "0" "3" "2" "1" for begin recording on March 21). The year and day of the week are displayed automatically.

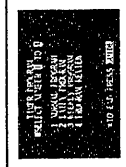


12. Press the GUIDE button to enter your program and return to the programming "menu" display. Additional programs may be entered by repeating Steps 6 through 11.
If you have no other programs to enter, press the GUIDE button twice.
The display returns to the TV screen.

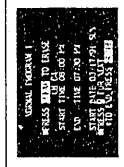


## RECALLING THE PROGRAM

1. Follow Steps 1 through 5 of "Programming the timer for unattended recording".
The programming "menu" appears on the TV screen.



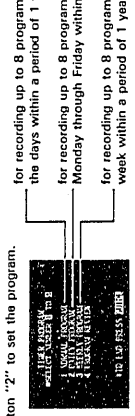
2. Press "4" button (Program Review).
The TV screen will display for 10 seconds the information you entered for the lowest program number. Then the display changes to the next higher program number and so on, until all program information has been displayed.
3. Press "4" again if you want to view the next program information immediately.
4. When you finish reviewing the programs, press the GUIDE button three times to switch off the on-screen display.



## TIMER RECORDING (cont)

4. Press the GUIDE button on the remote control unit until the "menu", as illustrated, appears on the TV.

5. Press button "2" to set the program.



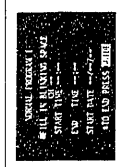
for recording up to 8 programs on a single day or over the days within a period of 1 year.

for recording up to 8 programs at the same time(s) Monday through Friday within a period of 1 year.

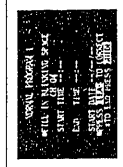
for recording up to 8 programs on certain days of every week within a period of 1 year.

**Note:** Any one of these program modes or any combination thereof (up to 8 programs in total) may be selected. A typical example of a "Normal" program is demonstrated below.

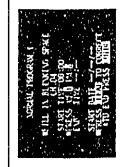
6. Press button "1". The display will prompt you to select the channel to be recorded.



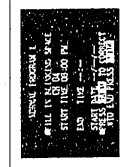
7. Press two digits for the channel to be recorded (for example, "0" "4" for channel 4). The display will prompt you to enter the recording start time.



8. Press four digits, two for the hour and two more for a minute (for example, "0" "6" "0" "0" for 6:00). The display will prompt you to select either AM or PM.
**Note:** Always press "0" before a single digit hour and minute.



9. Press "1" for AM or "2" for PM. The display will prompt you to select the stopping time.







## DISASSEMBLY

### 1. NAMES AND LOCATIONS OF CIRCUIT BOARDS

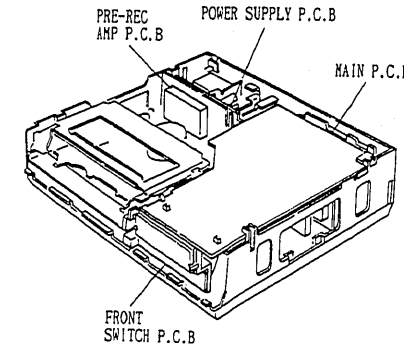



Fig. 1-1 Top View

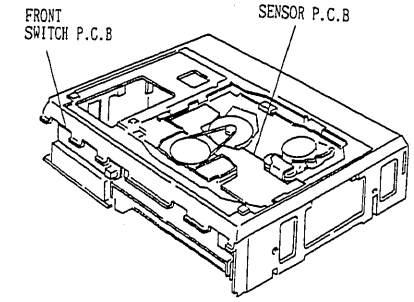



Fig. 1-2 Bottom View

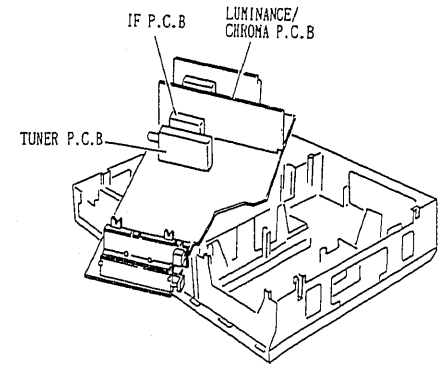



Fig. 1-3 State with Main P.C.B Opened

(Procedure when removing)
Remove the components in the order of letters (A, B, C ...) in the illustrations.

(Procedure when reinstalling)
Reinstall the components by the reverse procedure to removal when not otherwise specified.

### 2. CASE REMOVAL

1. Top Cover (Fig. 2-1)

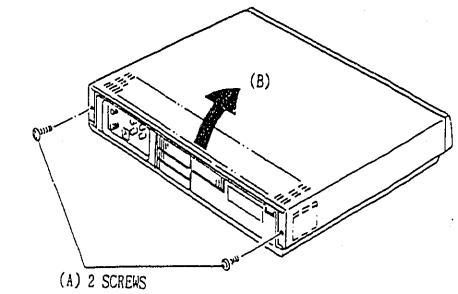



Fig. 2-1

2. Bottom Cover (Fig. 2-2)

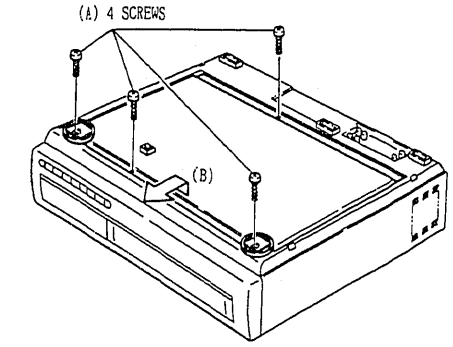



Fig. 2-2

3. Front Panel (Fig. 2-3)

| Components to remove previously | Item |
|---|---|
| Top Cover | 2-1 |
| Bottom Cover | 2-2 |

(Caution when reinstalling)
- Reinstall the front panel with the cassette door pushed in halfway so that the boss of the door arm is in front of the cassette door.

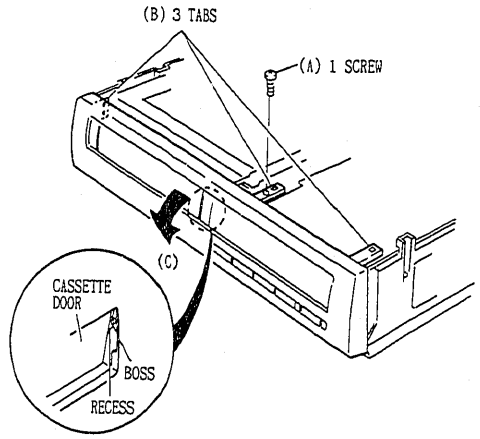



Fig. 2-3

4. Cassette Door (Fig. 2-4)

| Components to remove previously | Item |
|---|---|
| Top Cover | 2-1 |
| Bottom Cover | 2-2 |
| Front Panel | 2-3 |

1) Release the cassette door stopper.
2) Lift the cassette door and slide it in the direction of arrow (B) to remove it.

(Caution when reinstalling)
- Reinstall the spring at the right of the cassette door firmly.

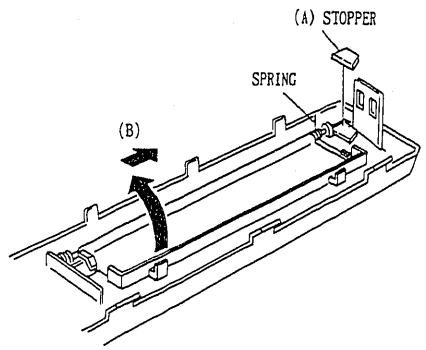



Fig. 2-4

Be sure to remove cases when servicing and checking the circuit boards.
- Top Cover (see item 2-1)
- Bottom Cover (see item 2-2)
- Front Panel (see item 2-3)

3. CIRCUIT BOARD REMOVAL
1. Main (Servo/System Control/Jack) Circuit Board (Fig. 3-1)

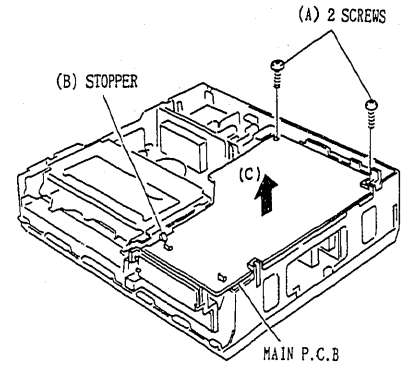



Fig. 3-1

(Rear Panel Removal)
- Remove one (1) screw on the rear panel while lifting the main circuit board and pull out the rear panel backwards.

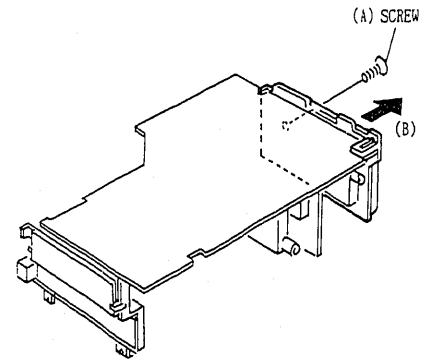



Fig. 3-2 Rear Panel Removal

2. Luminance/Chroma and FRONT Switch Circuit Boards (Fig. 3-3)

(Before removing)
1) Remove the main citcuit board. (Sceitem 2)

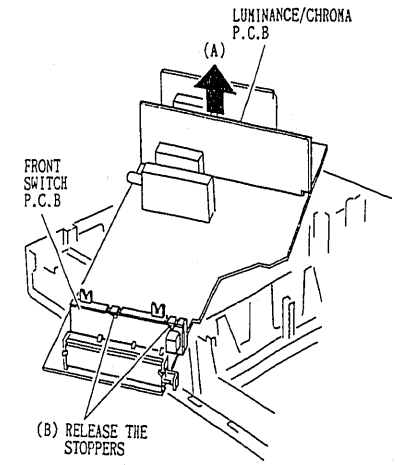



Fig. 3-3

3. Power Supply Circuit Board (Fig. 3-4)

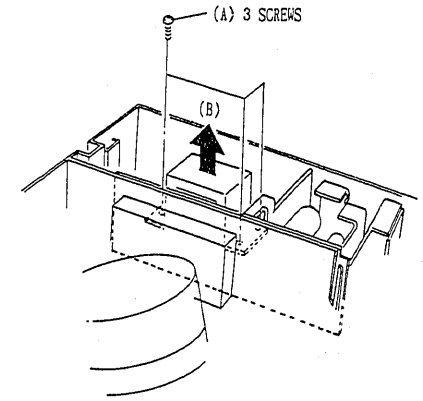



Fig. 3-4

4. Sensor Circuit Board (Fig. 3-5)

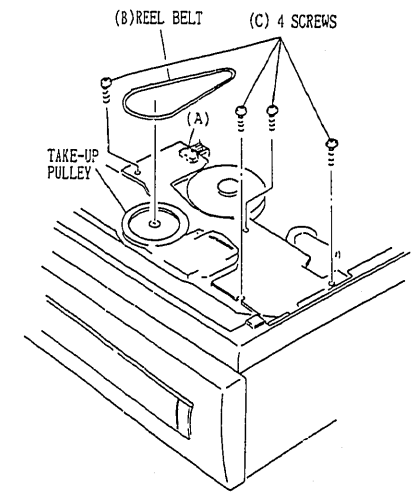



Fig. 3-5

5. IF and Tuner Circuit Boards (Fig. 3-6)

(Before removing)
1) Remove the main circuit board. (See item 2)

(How to remove)
Unsolder the connection terminals from the solder side of the main circuit board and then remove theIF and tuner circuit boards.

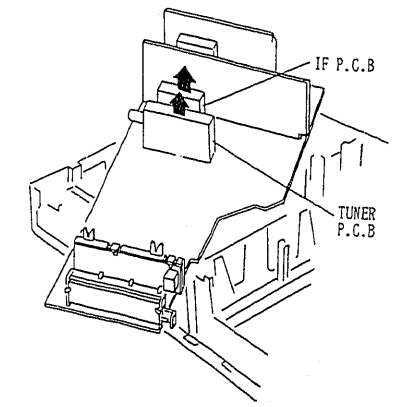



Fig. 3-6

Refer to the VT-M240A/M241A service manual (No. 3265E) for the names and locations of the main mechanical components and removal of the mechanical components.

CHAPTER 3

## ELECTRICAL ADJUSTMENT

Test equipment necessary for adjustment

- Dual-trace oscilloscope
  - ·Bandwidth : 10MHz or more
  - ·Probe : 10 : 1
- Color bar generator (NTSC)
- DC voltmeter
- Moniter TV
- Alignmet tapes
  - ·MH-1 (Parts No.7099046)
  - ·30HMP2-1 (Parts No.7099089)
- Blank tape

Before starting adjustment

- Remove the top cover
- Adjust the Main Circuit boards from the solder side and Luminance/Chroma Circuit boards from the component side and Tuner IF unit from the component side.

To set tracking to the center

- When "Tracking control : Center position" is specified, center the tracking as follows. (Press tracking button (▼ or ▲) on the remote control unit simultaneous)

### 1. SERVICE POSITION

1) Main Circuit Board

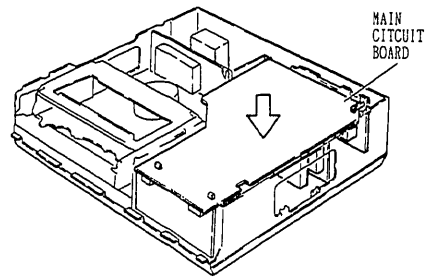



Fig. 4-1

2) Luminance/Chroma Circuit Board, Tuner IF Unit

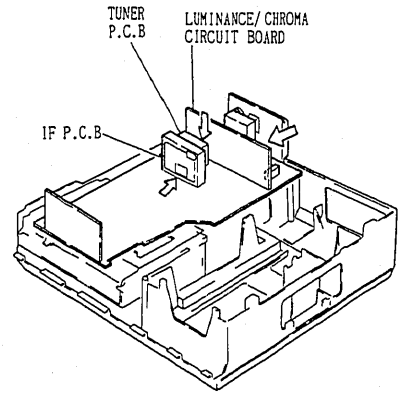



Fig. 4-2

### 2. ADJUSTMENT PARTS LOCATION

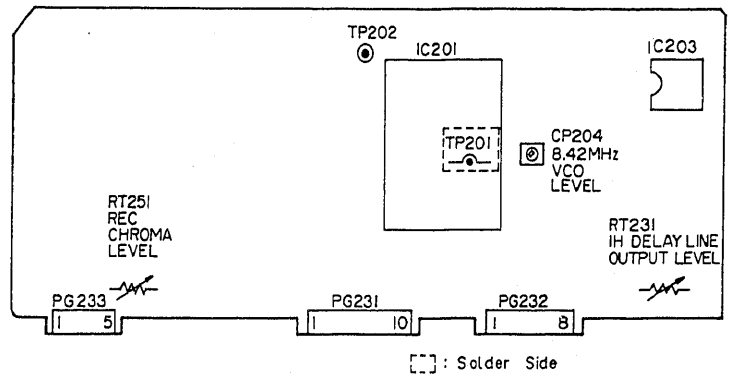



Fig. 4-3 Luminance/Chroma Circuit Board
(Components Side)



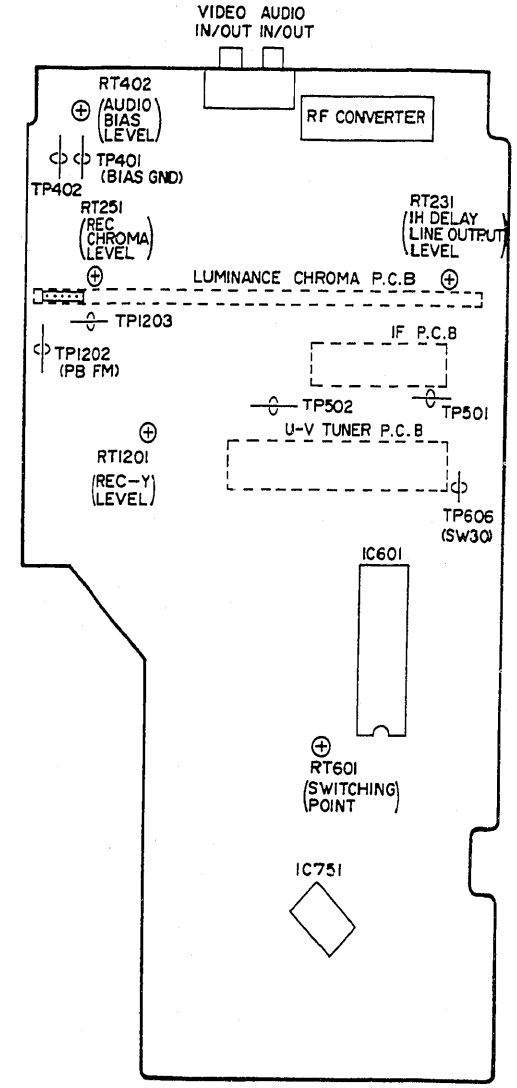



Fig. 4-4 Main Circuit Board
(Solder Side)

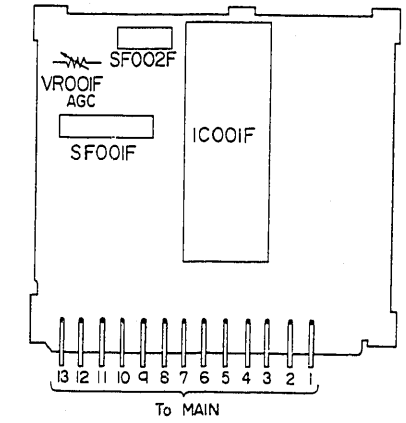



Fig. 4-5 IF P.C.B
(Components)

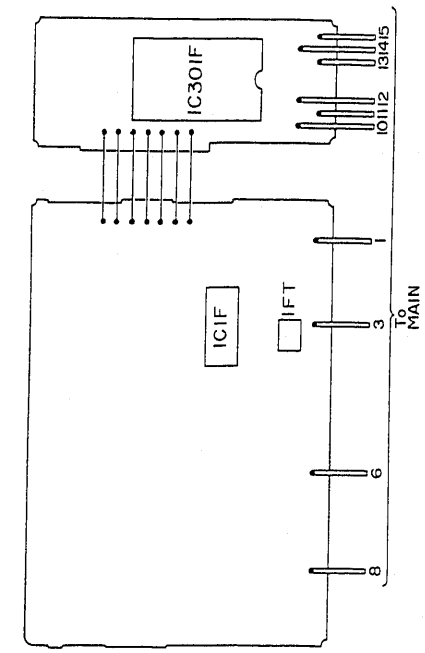
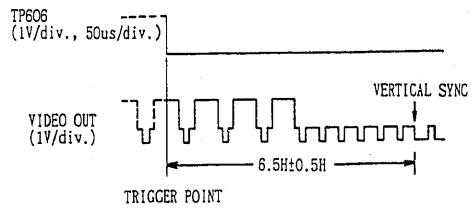



Fig. 4-6 Tuner P.C.B
(Components Side)

## 3. ADJUSTMENT POINTS

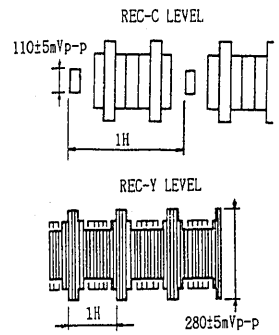
### 3-1 MAIN CIRCUIT (Servo Section)

| No | Item | State of Unit | Test Point | Adj. Point | Adjustment Procedure |
|---|---|---|---|---|---|
| 1 | Switching Point Adjustment | ·SP mode<br>·Play a NTSC alignment tape<br>·Tracking control: Center | ·Video output jack<br>·TP606 (SW30Hz) | ·RT601 | 1) Set the sync slope switch of the oscilloscope to "⎯".<br>2) Adjust RT601 so the leading edgeat TP606(SW30) is 6.5±0.5H before the front porch of the vertical sync signal. |
| | (Waveforms)<br>  <br>Fig. 4-7 | | | | (Alignment tape used)<br>·NTSC : MH-1 (Parts No.7099046) |

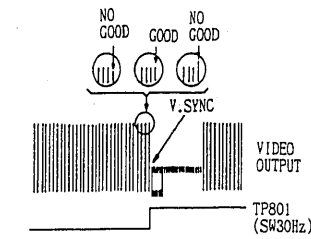
### 3-2 MAIN CIRCUIT (Audio Section)

| No | Item | State of Unit | Test Point | Adj. Point | Adjustment Procedure |
|---|---|---|---|---|---|
| 1 | Audio Bias Level Adjustment | ·REC mode<br>·SP mode | ·TP402<br>·TP401 (BIAS GND) | ·RT402 | 1) Connect a VTVM to TP402 and TP401 (GND).<br>2) Adjust RT402 so the bias level is 2.3±0.1mV |
| | (Caution during adjustment)<br>·Perform adjustment without applying a video or audio signal. | | | | |

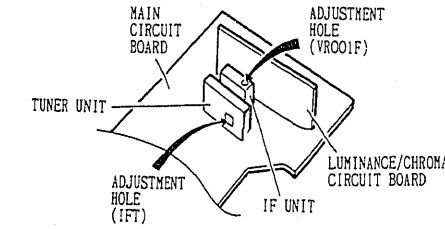
### 3-3 LUMINANCE/CHROMA CIRCUIT

| No | Item | State of Unit | Test Point | Adj. Point | Adjustment Procedure |
|---|---|---|---|---|---|
| 1 | 8.42MHz VCO Level Adjustment | ·E-E mode<br>·Color bar signal input | ·TP201 | ·CP204 | 1) Connect a VTVM between TP201 and ground.<br>2) Adjust the 8.42MHz VCO level (CP204) so the DC level is 2.35± 0.05V. |
| 2 | Record chroma Level Adjustment | ·Color bar signal input<br>·EP mode<br>·REC mode | ·PG833-2<br>TP1203 | ·RT251<br>·RT1201 | 1) Connect a oscillscope between PG833-2 and ground.<br>2) Adjust the Record Chrom Level Control (RT251) so that the color burst level is 110±5mV.<br>3) RT1201 : Set the luminance recording level to 280mV±5mVp-p. |
| | (Waveforms)<br>  <br>Fig. 4-8 | | | | |

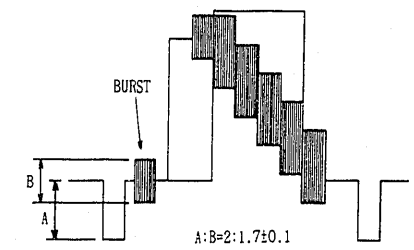


| No | Item | State of Unit | Test Point | Adj. Point | Adjustment Procedure |
|---|---|---|---|---|---|
| 3 | 1H Delay Line Output Level Adjustment | ·Play NTSC alignment tape | ·TP606 (SW30Hz)<br>·Video output jack | ·RT231<br>·RT601 | 1) Adjust RT601 to match the phase of the leading edge of the pulse at TP606 (SW30) and the phase of the V.SYNC signal.<br>2) Adjust the 1H Delay Line Out Level control (RT231) so that the amplitude (height) of the last H.sync signal is equal to the heights of the other signals.<br>3) After completing adjustment in step 2, adjust RT601 to set the switching point to 6.5H±0.5H. |
| | (Waveforms)<br>  <br>Fig. 4-9 | | | | |

### 3-4 IF CIRCUIT

| No | Item | State of Unit | Test Point | Adj. Point | Adjustment Procedure |
|---|---|---|---|---|---|
| 1 | AGC Adjustment | ·NTSC color bar signal input | ·TP501 | ·VR001F | 1) Supply a 199.25MHz/-39dbm of RF NTSC color bar signal with 87.5% modulation to the VHF antenna terminal.<br>2) Tune is the RF channel supplied by the NTSC color bar generator (select channel 11).<br>3) Connect a DVM to the TP501 on the main circuit board.<br>4) Adjust the AGC control (VR001F) for 5.3±0.1V DC. |
| | (Adjust Point)<br>  <br>Fig. 4-10 | | | | |

### 3-5 TUNER CIRCUIT

| No | Item | State of Unit | Test Point | Adj. Point | Adjustment Procedure |
|---|---|---|---|---|---|
| 1 | IFT Adjustment | ·NTSC color bar signal input | ·TP502 | ·IFT | 1) Tune in the RF channel upplied by NTSC color bar generator (Select channel 11).<br>2) Connect a scope probe to the TP502 on the main circuit board.<br>3) Adjust the core of the IFT so the ration between SYNC level (A) and burst level (B) is 2 :1.7±0.1 as shown in Fig. Fig.4-11<br>Note : Check that the yellow level of the chroma signal does not exceeds the 100% white level.<br>IF itdoes, readjust the core. |
| | (Waveforms)<br>  <br>Fig. 4-11<br>(Adjust Point : See Fig.4-10) | | | | |

Refer to the VT-M240A (No. 3265E) for the mechanism adjustments except the X-value adjustment and adjustment after the cylinder (video heads) is replaced.

## 6. X Value Adjustment

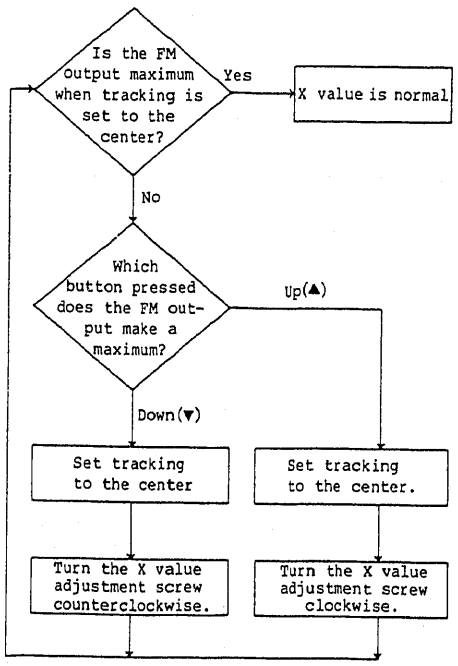
Purpose: To make compatible with other VTRs.

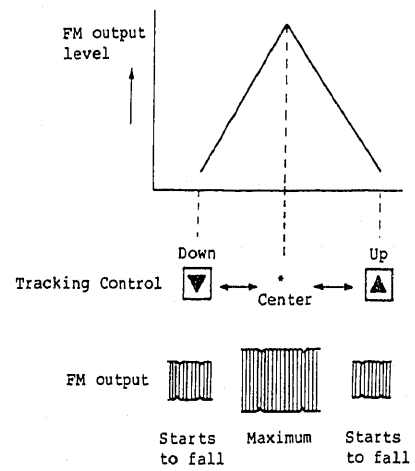
| Test Equipment/Jigs | Test Equipment Connection Points | State of VTR | Adjustment Point |
|---|---|---|---|
| o Oscilloscope | o CH-1: TP1202 (PB FM)<br>o CH-2: TP606 (SW 30Hz) | o Play alignment tape (step waveform if MH-1 alignment tape is used). | o X value adjustment screw |
| o Aligment tapes (Parts No.7099046) (Parts No.7099089)<br>o 1.5mm hexagonal wrench | —— | | |

**Connection diagram**
See page 4-4 for the connection of test equipment.

**Adjustment procedure**
(Adjustment using 30HMP2-1 alignment tape)
Adjust so that the FM output is maximum when the tracking is at the center.

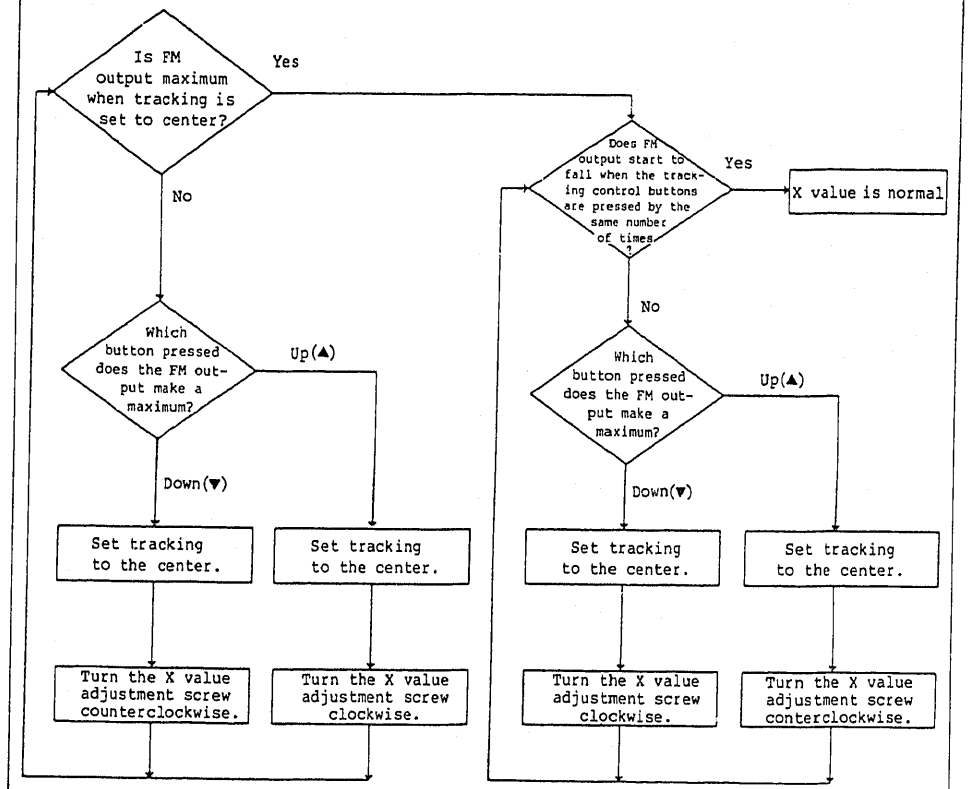
Note: To set tracking to the center position
o Press the EJECT button to remove the alignment tape and re-insert it.


Is the FM output maximum when tracking is set to the center?
Yes
X value is normal
No
Which button pressed does the FM output make a maximum?
Up(▲)
Down(▼)
Set tracking to the center
Set tracking to the center.
Turn the X value adjustment screw counterclockwise.
Turn the X value adjustment screw clockwise.

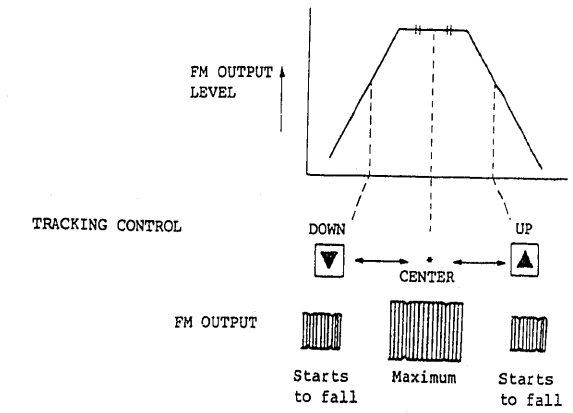





**Adjustment procedure**
(Adjustment using MH-1 alignment tape)
Adjust so that the FM output is maximum when tracking is set to the center.
Then press the tracking control buttons and adjust so that the FM output starts to fall when both buttons are pressed by the same number of times.


Is FM output maximum when tracking is set to center?
Yes
No
Does FM output start to fall when the tracking control buttons are pressed by the same number of times?
Yes
X value is normal
No
Which button pressed does the FM output make a maximum?
Up(▲)
Down(▼)
Set tracking to the center.
Set tracking to the center.
Turn the X value adjustment screw counterclockwise.
Turn the X value adjustment screw clockwise.
Which button pressed does the FM output make a maximum?
Up(▲)
Down(▼)
Set tracking to the center.
Set tracking to the center.
Turn the X value adjustment screw clockwise.
Turn the X value adjustment screw conterclockwise.

**Adjustment diagram**



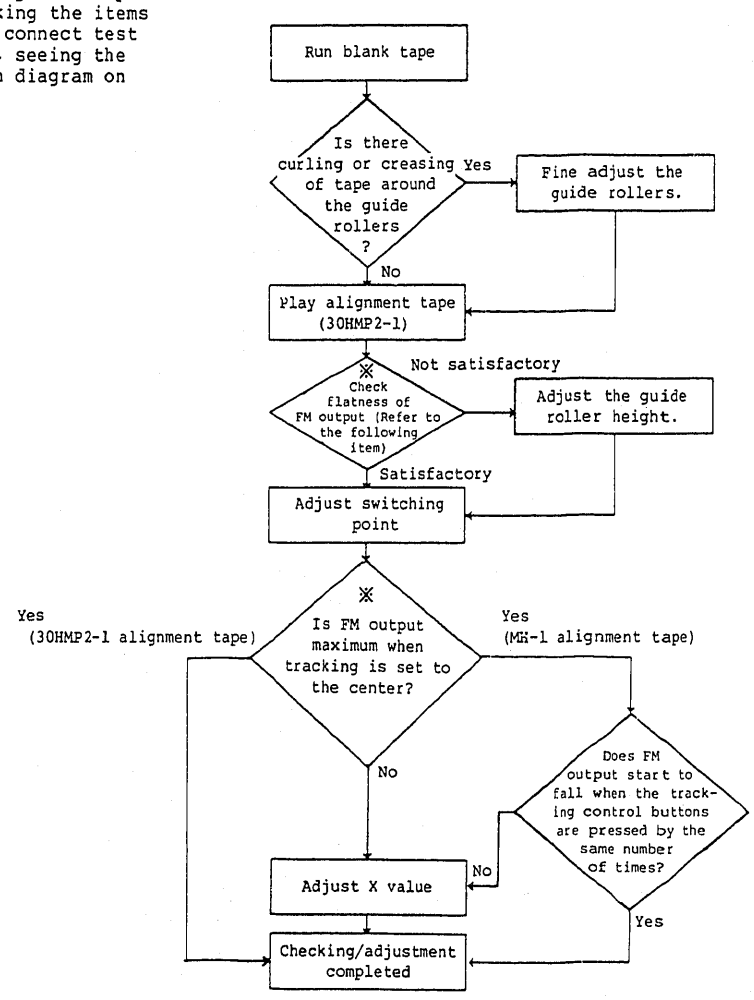
## 7. Adjustments After Replacing Cylinder (Video Heads)

Purpose: To suppress drift in the height relative to the guide roller and drift of the X value after replacing the cylinder.

| Test Equipment/Jigs | Test Equipment Connection Points | State of VTR | Adjustment Points |
|---|---|---|---|
| o Oscilloscope | Checking the flatness<br>o CH-1: TP1202 (PB FM)<br>o CH-2: TP606 (SW 30Hz) | o Run the blank tape<br>o Play alignment tape | o Guide rollers<br>o Switching point<br>o X value (page 4-8) |
| o Alignment tapes (Parts No.7099046) (Parts No.7099089)<br>o Blank tape<br>o 1.5mm, 0.9mm hexagonal wrench<br>o X value adjustment screwdriver | — | | |

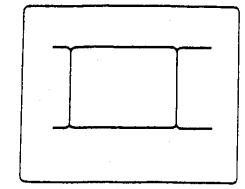
**Checking/adjustment procedure**

When checking the items marked *, connect test equipment, seeing the connection diagram on page 4-4.

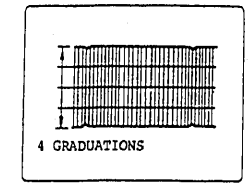

Run blank tape
Is there curling or creasing of tape around the guide rollers ?
Yes
Fine adjust the guide rollers.
No
Play alignment tape (30HMP2-1)
※ Check flatness of FM output (Refer to the following item)
Not satisfactory
Adjust the guide roller height.
Satisfactory
Adjust switching point
※ Is FM output maximum when tracking is set to the center?
Yes (30HMP2-1 alignment tape)
Yes (MH-1 alignment tape)
No
Does FM output start to fall when the tracking control buttons are pressed by the same number of times?
No
Yes
Adjust X value
Checking/adjustment completed

**Checking procedure of the flatness and fluctuations of FM output and waveform diagrams**

1) Use the tracking control buttons to maximize the FM output.

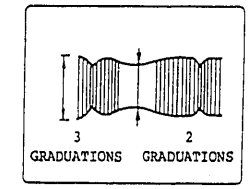


2) Fine tune the voltage level range of the osciloscope to set the FM output to 4 graduations.



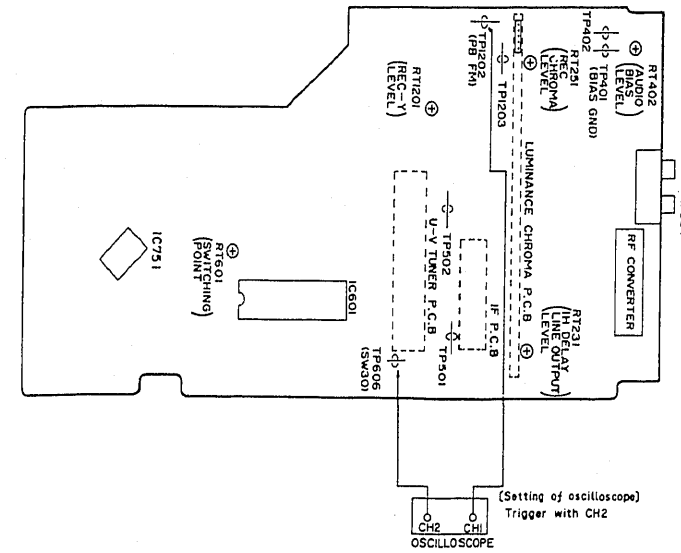

3) Press the tracking control buttons to set maximum amplitude of the FM output to 3 graduations.

4) Check that the minimum amplitude is more than 2 graduations.




5) Check that the level fluctuations between the maximum and minimum amplitudes are less than 13%.

Connection diagram

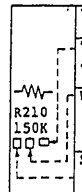


# SCHEMATIC/CIRCUIT BOARD DIAGRAMS

## BEFORE USING THIS SERVICE REFERENCE MATERIAL

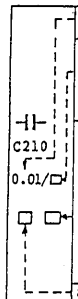
### How to read abbreviations

(Resistors)




| | | |
|---|---|---|
| | Value | Not indicated .. Ω(ohm)<br>K ..... kΩ |
| | Tolerance | Not indicated .. ±5%<br>K ..... ±10%<br>M ..... ±20% |
| | Wattage | Not indicated .. 1/8W<br>(All values other than 1/8W are indicated in the schematic diagrams with W omitted) |
| | Sort | Not indicated .. Carbon film<br>RC ..... Carbon solid<br>RW ..... Wire wound<br>RS ..... Metal oxide film<br>RN ..... Metal film |
| Example: R120 ..... 150kohm, carbon solid<br>RC1/2K 1/2W, ±10% | | |

(Capacitors)




| | | |
|---|---|---|
| | Value | Not indicated .. μF<br>P ..... PF |
| | Dielectric strength | Not indicated .. 50WV<br>(All values other than 50WV and electrolytic capacitors are indicated in the schematic diagrams with WV omitted) |
| | Tolerance | Not indicated .. ±10%<br>J ..... ±5%<br>M ..... ±20%<br>C ..... ±0.25PF<br>Z ..... +80%<br>-20%<br>(No tolerance is indicated for electrolytic capacitors (excluding tantalum and high stability electrolytic capacitors)) |
| | Sort | Not indicated .. Ceramic<br>General electrolytic (distinguished from ceramic with circuit symbol)<br>MYL ..... Mylar (polyester film)<br>STY ..... Styrol<br>TA ..... Tantalum<br>KU ..... High stability electrolytic<br>MP ..... Metalized paper |
| Example: C210<br>0.01/25 ... Mylar, 0.01μF, 25WV, ±5%<br>MYL J | | |

Notes:

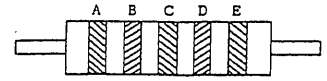
1. Voltages are measured with the negative ⊖ terminal of the power supply as reference in the normal operating mode. The voltages in different modes are indicated in the schematic diagrams; those in parentheses ( ) are in the record mode and those without parentheses are in the play mode.
2. The value, dielectric strength (wattage), tolerance and sort of resistors (excluding variable resistors, etc.) and capacitors are indicated in the schematic diagrams by abbreviations. Replace them correctly, comparing the abbreviations in the schematic diagrams and the table "how to read abbreviations".

### Cautions on use of MOS IC

1. The MOS IC is inserted in black foam for shipment. This foam is a conductor which short-circuits between the leads to prevent damage. Do not remove ICs from this foam during their storage. Avoid removing ICs from this foam, placing them on plastic which is likely to be charged with static electricity or inserting them into styrol foam.
2. High voltages may be applied during soldering caused by leakages from the soldering iron, so be sure to ground the tip of the soldering iron or use a low voltage soldering iron.
3. The human body, clothes made of synthetic fibers or nylon gloves may be charged with several thousands volts of static electricity because of friction, so a worker should be grounded.
4. Be sure to ground measuring instruments such as oscilloscopes, VTVMs, etc. used for repairs.

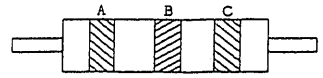
### How to read capacity and inductance of resistor shape capacitors and coils

CAPACITOR




CAPACITY: (10A+B) x C (PF)
TOLERANCE: D
RATED VOLTAGE: BODY COLOR
PINK: 25V
GREEN: 50V
CHARACTERISTICS: E

COIL




INDUCTANCE: (10A+B) x C (μH)

| COLOR | A,B | C | D | E |
|---|---|---|---|---|
| Black | 0 | $10^0$ | ±20% | For temperature compensation |
| Brown | 1 | $10^1$ | | |
| Red | 2 | $10^2$ | | |
| Orange | 3 | $10^3$ | | |
| Yellow | 4 | $10^4$ | | |
| Green | 5 | $10^5$ | | |
| Blue | 6 | | | |
| Violet | 7 | | | |
| Gray | 8 | | ±30% | High dielectric constant type |
| White | 9 | | | For temperature compensation |
| Gold | | $10^{-1}$ | ±5% | |
| Silver | | $10^{-2}$ | ±10% | High dielectric constant type |



## SERVICE MANUAL ABBREVIATION LIST

| | |
|---|---|
| **A** | |
| A.DUB | Audio Dub |
| ACC | Automatic Color Control |
| ACK | Automatic Color Killer |
| ADD | Adder |
| AFC | Automatic Frequency Control |
| AGC | Automatic Gain Control |
| ALC | Automatic Level Control |
| ASBL | Assemble (Phase Matching) |
| APC | Automatic Phase Control |
| AUX | Auxiliary |
| **B** | |
| BATT. | Battery |
| BG | Burst Gate or Back Ground |
| BGP | Burst Gate Pulse |
| BH | Power Supply for Selecting VHF High Band |
| BL | Power Supply for Selecting VHF Low Band |
| BPF | Band-pass Filter |
| BS | Power Supply for Selecting VHF Super Band |
| BU | Power Supply for Selecting UHF Band |
| BUF. | Buffer Amplifier |
| **C** | |
| C | Chroma |
| C.FG/CFG | Capstan Frequency Generater |
| C.MEMORY | Counter Memory |
| C.PAUSE | Camera Pause |
| C.RESET | Counter Reset |
| C.REVERSE | Count Reverse |
| C.SYNC | Composite Synchronizing Signal |
| C/R | Capacitor/Resistor |
| CATV | Cable TV |
| CAPST. | Capstan |
| CCD | Charge Coupled Device |
| CH | Channel |
| CNR | Chroma Noise Reducer |
| CHAR. | Character |
| COM. | Common |
| COMP-EXP | Compressor-Expander |
| COMPA | Comparator |
| COMPE | Compensator |
| COM. | Composite |
| CONV. | Converter |
| CORR. | Correlation |
| COUNT. | Counter |
| CST | Cassette |
| CTL | Control Track Pulse |
| CYL. | Cylinder |
| **D** | |
| D/A | Digital to Analog |
| D/W | Dark/White |
| DA | Double Azimuth |
| DEEMPH. | Deemphasis |
| DEMOD. | Demodulator |
| DET | Detector |
| DISCRI. | Discriminator |
| DISP. | Display |
| DL | Delay line |
| DN | Down |
| DO | Dropout |
| DOC | Dropout Compensator |
| **E** | |
| E-E | Electronic-to-Electronic |
| EA-ROM | Electrically Alterable Read Only Memory |
| EMPH | Emphasis |
| EQ | Equalizer |
| EXT. | External |
| **F** | |
| FF | Flip Flop |
| F.FWD | Fast Forward |
| FG | Frequency Generator |
| FM | Frequency Modulation |
| FRAME ADV./F.ADV | Frame Advance |
| fsc | Color Sub Carrier Frequency |
| FWD | Forward |
| **G** | |
| GEN | Generator |
| GND | Ground |
| **H** | |
| HD | Horizontal Drive |
| Hi-Fi | High Fidelity |
| HPF | High-pass Filter |
| HPL | High-pass Limiter |
| HSS | Horizontal Sync. Separator |
| **I** | |
| I/O | In/Out (Input/Output) |
| IF | Intermediate Frequency |
| INDI. | Indicator |
| INT. | Internal |
| INV. | Inverter |
| IR | Infrared Rays |
| IRT | Instant Recording Timer |
| **L** | |
| LCD | Liquid Crystal Display |
| LIN. | Linear |
| LNC | Line Noise Canceller |
| LM | Loading Motor |
| LOG. | Logarithm |
| LPF | Low-pass Filter |
| L/R | Left/Right |
| LP | Long play |
| **M** | |
| M.CUT | Monitor Cut |
| M.STATE | Mechanism State |
| M.STOP | Memory Stop |
| MEM. | Memory |
| MIX | Mixer |
| MM | Monostable Multivibrator |
| MOD. | Modulator |
| MPX | Multiplex |
| MTS | Multi Channel Television Sound |
| **N** | |
| NF | Negative Feed Back |
| NORM.or NOR. | Normal |
| NR | Noise Reduction |

| O | |
|---|---|
| OSC | Oscillator |
| OSD | On-Screen Display |
| **P** | |
| PB/PLAY | Playback |
| PIF | Picture Intermediate Frequency |
| PLL | Phase Locked Loop |
| POS. | Positive |
| POWER CONT. | Power Control |
| PROG. | Program |
| PROTECT. | Protector |
| PWM | Pulse Width Modulation |
| **R** | |
| REC | Record |
| RECT. | Rectifier |
| REF | Reference |
| REG | Regulator |
| REV | Reverse |
| REW | Rewind |
| RF | Radio Frequency |
| RAM | Randum Access Memorey |
| ROM | Read Only Memory |
| **S** | |
| S/H | Sample and Hold |
| S.REEL | Supply Reel Sensor |
| S.TRACK. | Slow Tracking |
| S-VHS | Super VHS |
| SAW | Sawtooth |
| SAP | Second Audio Program |
| SEP. | Separator |
| SIF | Sound Intermediate Frequency |
| SP | Standard Play |
| SRCH | Search |
| SRV | Servo |
| SW 25Hz | Head Switching Pulse |
| SYNC | Synchronizing Signal |
| SYS.CON | System Control |
| **T** | |
| T/L | Tuner/Line |
| T.BRAKE | Take-up Brake |
| T$\mu$p | Timer Microprocessor |
| T.REEL | Take-up Reel Sensor |
| T.RESET | Timer Reset |
| TP | Test Point |
| TRS | Transfer |
| TU-$\mu$P | Tuning Microprocessor |
| **U** | |
| U/D | Up/Down |
| UNI. | Unified |
| **V** | |
| V-REF | Voltage Reference |
| V.DRV | Vertical Drive Pulse |
| V.DUB | Video Dub |
| VAR. | Variable |
| VCA | Voltage Controlled Amplitier |
| VCO | Voltage Controlled Oscillator |
| VHS | Video Home Systems |

| | |
|---|---|
| Vss | Voltage Super Source |
| VOL. | Volume |
| VSS | Vertical Sync. Separator |
| VT | Tuning Voltage |
| VT-U | Tuning Voltage-UHF |
| VT-V | Tuning Voltage-VHF |
| **W** | |
| WE | Weighting |
| **Y** | |
| Y/C | Luminance/Chrominance |

## DIGITAL PROCESS CIRCUIT

| A | |
|---|---|
| ADC B-Y | Analog to Digital Converted B-Y Signal |
| ADC R-Y | Analog to Digital Converted R-Y Signal |
| ADC Y | Analog to Digital Converted Luminance |
| ADRS | Address |
| **C** | |
| CAS | Column Address Strobe |
| C.BLANK | Chroma Blanking |
| **D** | |
| DRAM | Dynamic Random Access Memory |
| DEMPX | Demultiplexer |
| DWC | Delayed Write Clock |
| DT/OE | Date Transfer /Output Enable |
| D.REF 25 | Delayed Reference 25Hz |
| D.SW 25 | Delayed Switching 25Hz |
| **I** | |
| INC | Row Counter Increment |
| **M** | |
| MEM | Memory |
| MEM VIDEO | Memorized Video |
| MEM SW | Memory Switch |
| MEM ON | Memory ON |
| MPX | Multiplexer |
| MPX VIDEO | Multiplexed Video |
| **O** | |
| O/E | Odd/Even Field |
| **P** | |
| P IN P | Picture in Picture |
| PIX MOVE | Picture Move |
| **R** | |
| RC | Reading Clock |
| RCC | Reading Clock Clear |
| RCR | Row Counter Reset |
| RAS | Row Address Strobe |
| REF 25 | Reference 25Hz from servo circuit |
| REL | Refresh Control |
| **S** | |
| SC | Serial Control |
| **W** | |
| WC | Write Clock |
| WCC | Write Clock Clear |
| WRITE ENBL (WE) | Write Enable |



## SEMICONDUCTOR CONFIGURATION

When replacing a semiconductor, take care of its pin numbers and makings (recess, paint) so as not to insert it in reverse.

### TRANSISTOR

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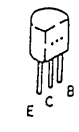
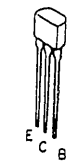
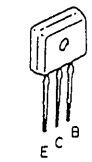
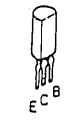
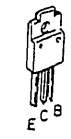
|  |  |  |  |  |
| 2SA673C 2SA844CD<br>2SA854SQR 2SC1213 | 2SC1740S DTC144ES<br>DTA144ES PT-483F1 | 2SC3553BC | 2SB562C | 2SD1765 |

### IC (SINGLE INLINE PACKEGE)

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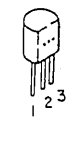
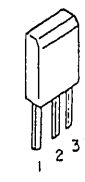
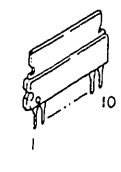
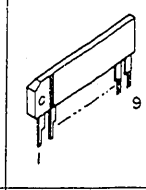
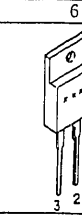
|  |  |  |  | |  |
| 8053ALB<br>PST529I | DN6851 | XRA6209U4 | NJM2248 | LM340CT2 | M5F7805 |

### IC (DUAL INLINE PACKAGE)

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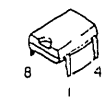
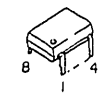
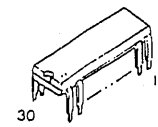
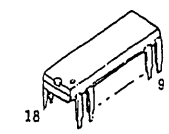
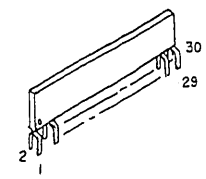
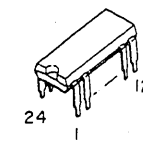
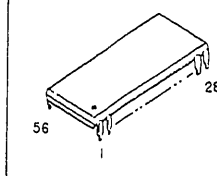
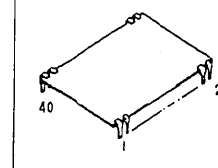
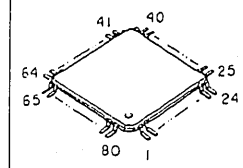
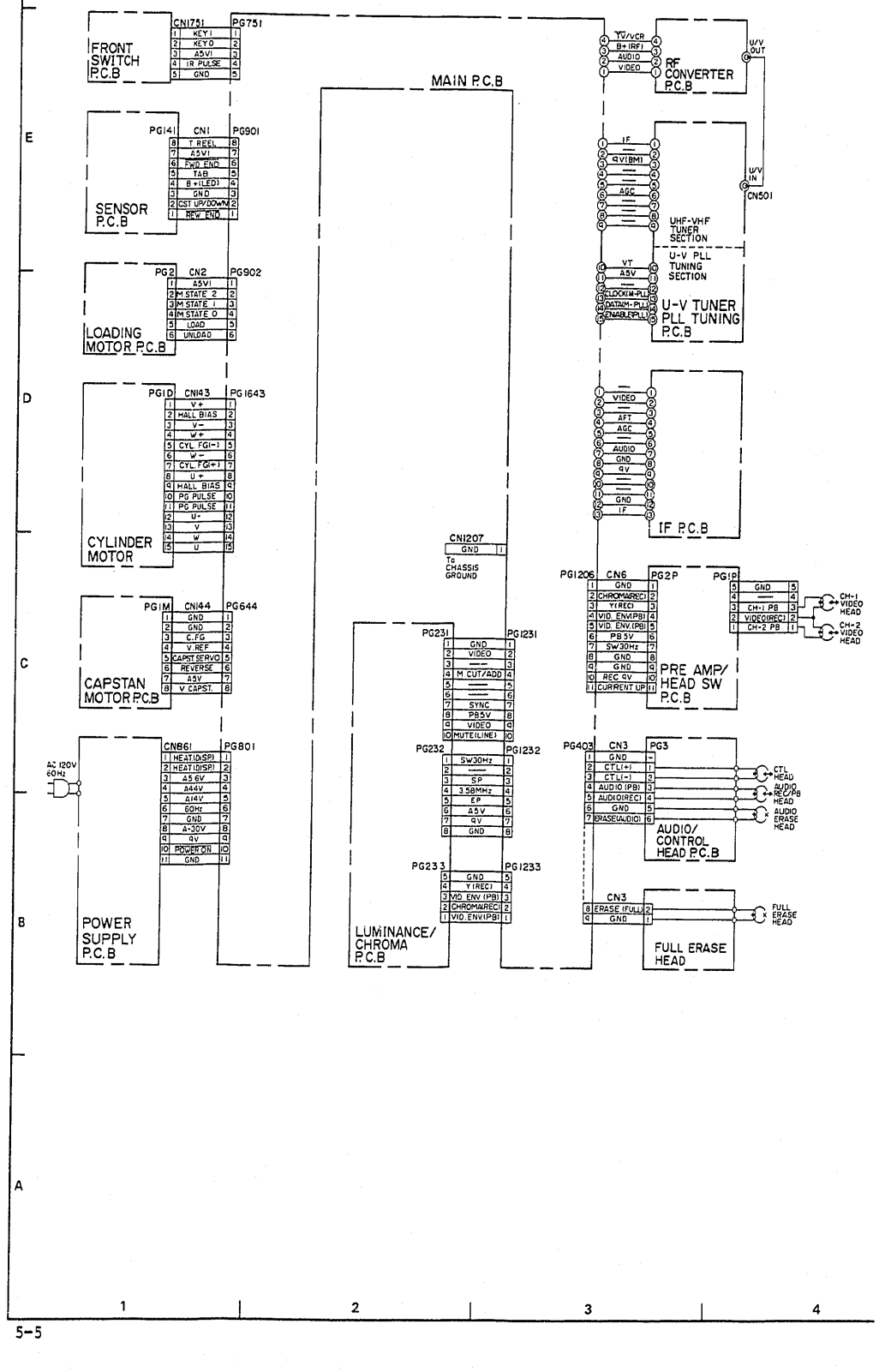
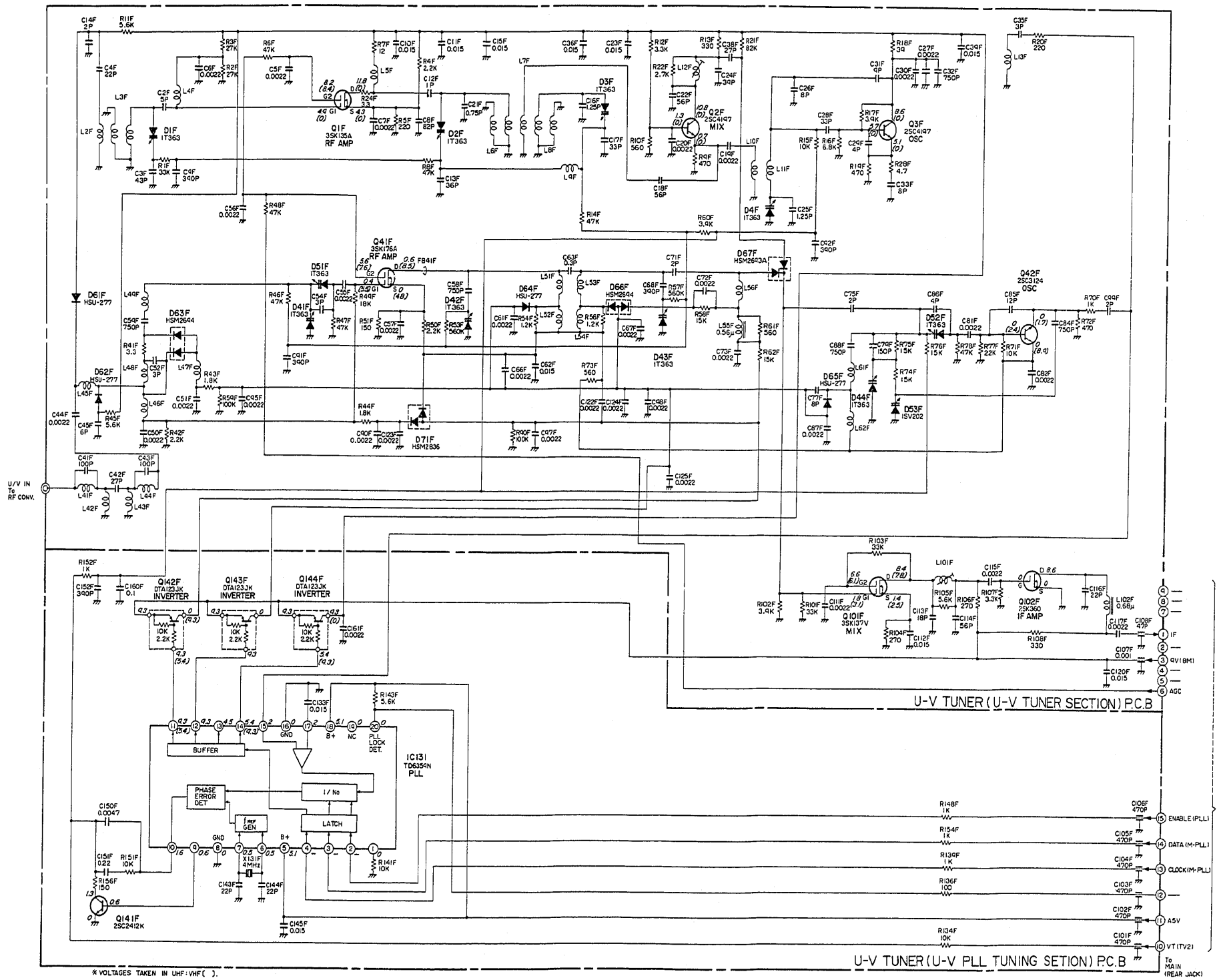
|  |  |  |  |
| BA6993 | MSM7400RS | HA118108NT | UPD6450CX-703 |
| **5** | **6** | **7** | **8** |
|  |  |  |  |
| LA7297 | XRA64591 | HD49747N | HT7225 |
| **9** | | | |
|  | | | |
| CXP50116-142Q | | | |

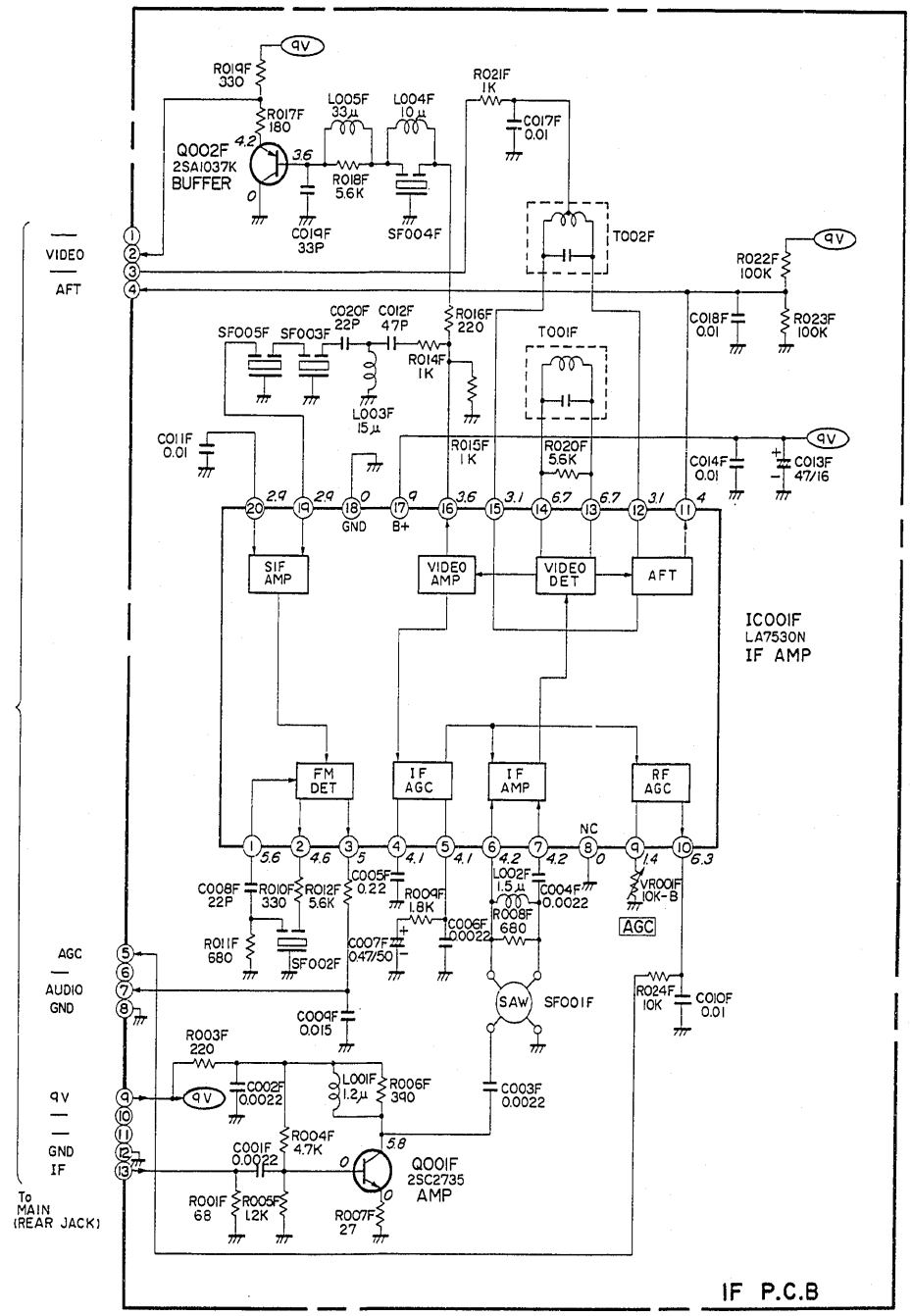
# INTERNAL WIRING DIAGRAM



# U-V TUNER SCHEMATIC DIAGRAM

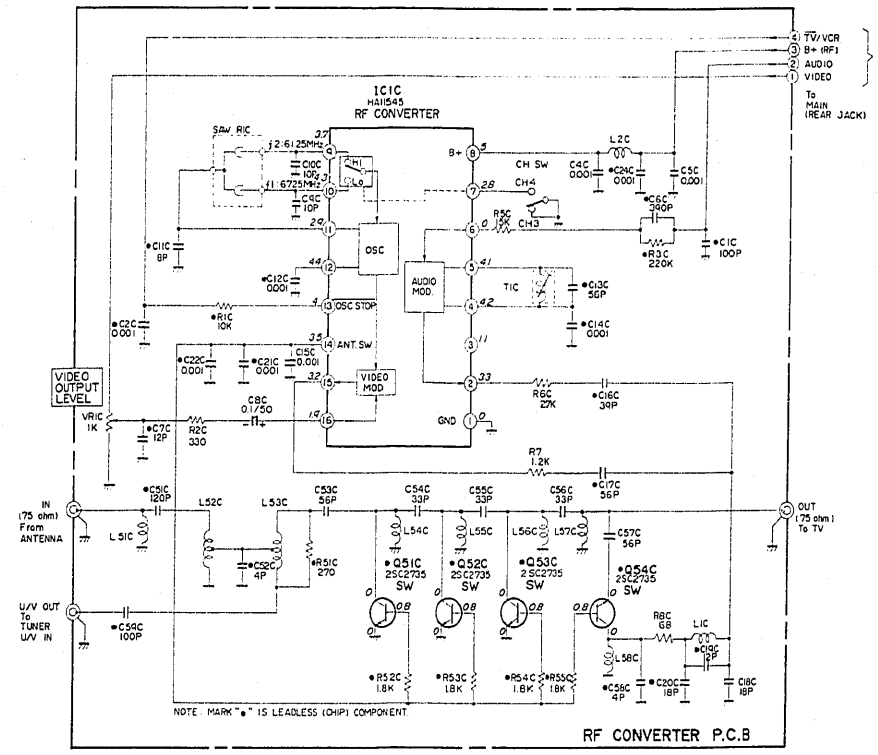


## IF SCHEMATIC DIAGRAM

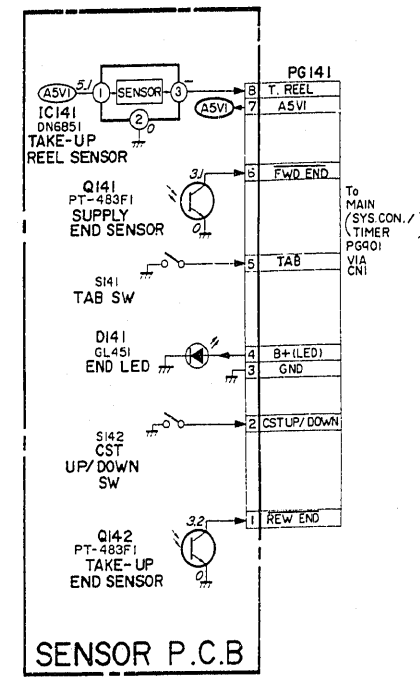



IF P.C.B

## RF CONVERTER SCHEMATIC DIAGRAM



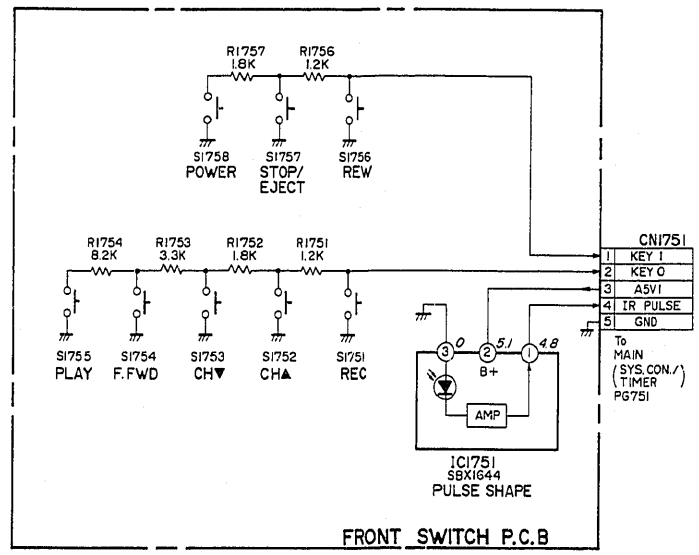

## SENSOR SCHEMATIC DIAGRAM



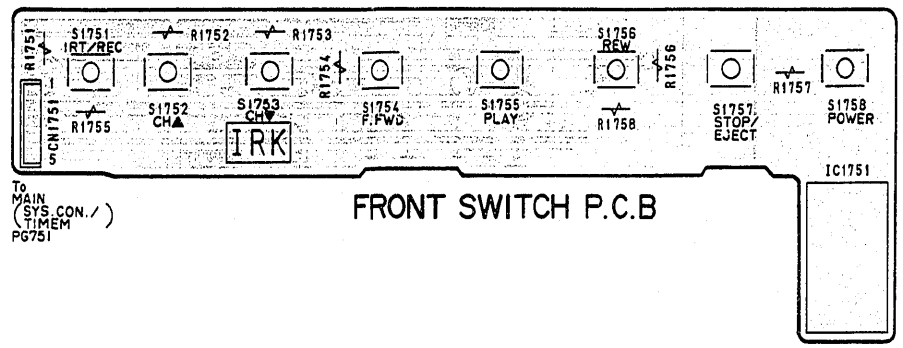


| SCHEMATIC DIAGRAM | PAGE |
|---|---|
| U-V TUNER | 5-6 |
| IF | 5-8 |
| RF CONVERTER | 5-9 |
| SENSOR | 5-9 |
| FRONT SWITCH | 5-10 |
| PRE/REC AMP | 5-11 |
| SYS.CON./TIMER | 5-12 |
| AUDIO | 5-14 |
| CLY.MOTOR DRIVE | 5-15 |
| CAPSTAN MOTOR | 5-15 |
| REAR JACK | 5-18 |
| LUMINANCE/CHROMA | 5-22 |
| POWER SUPPLY | 5-26 |
| 14V REGULATOR | 5-26 |

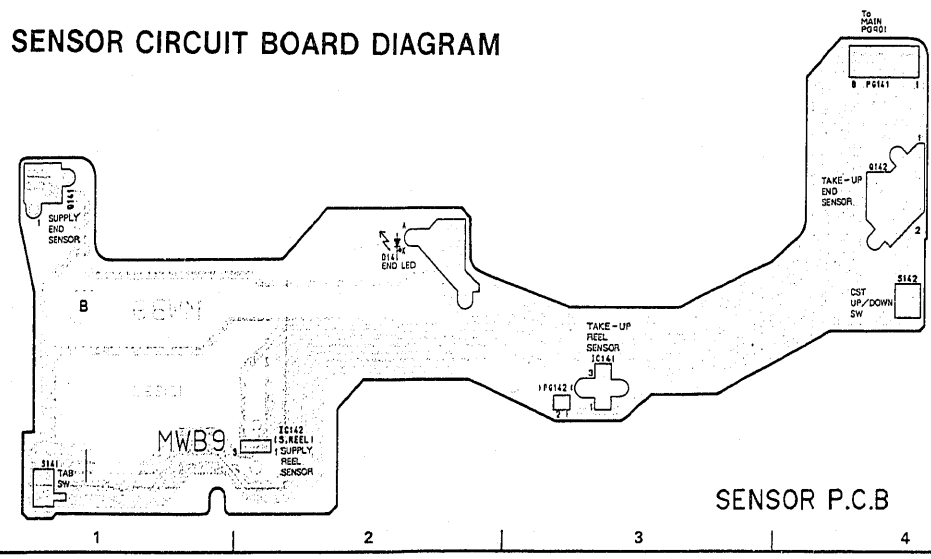
## FRONT SWITCH SCHEMATIC DIAGRAM



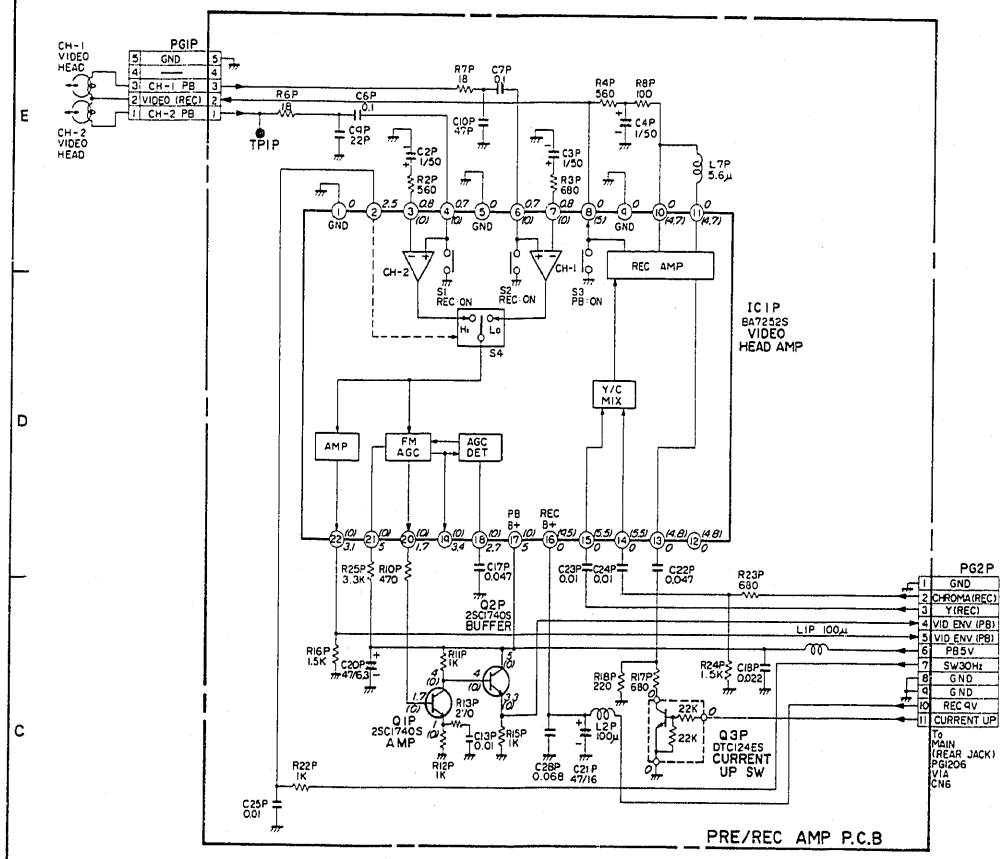

## FRONT SWITCH CIRCUIT BOARD DIAGRAM




## SENSOR CIRCUIT BOARD DIAGRAM



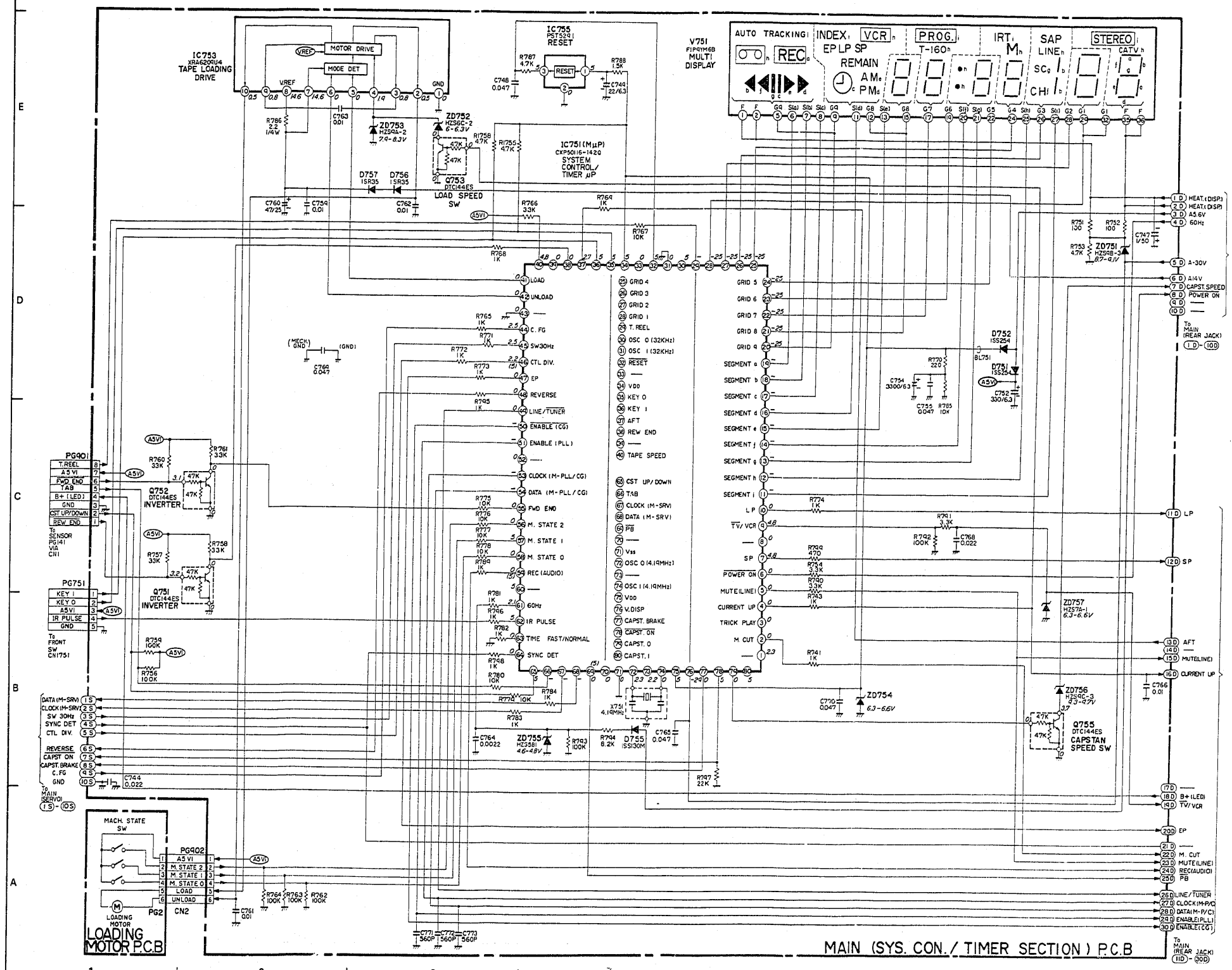
# PRE/REC AMP SCHEMATIC DIAGRAM



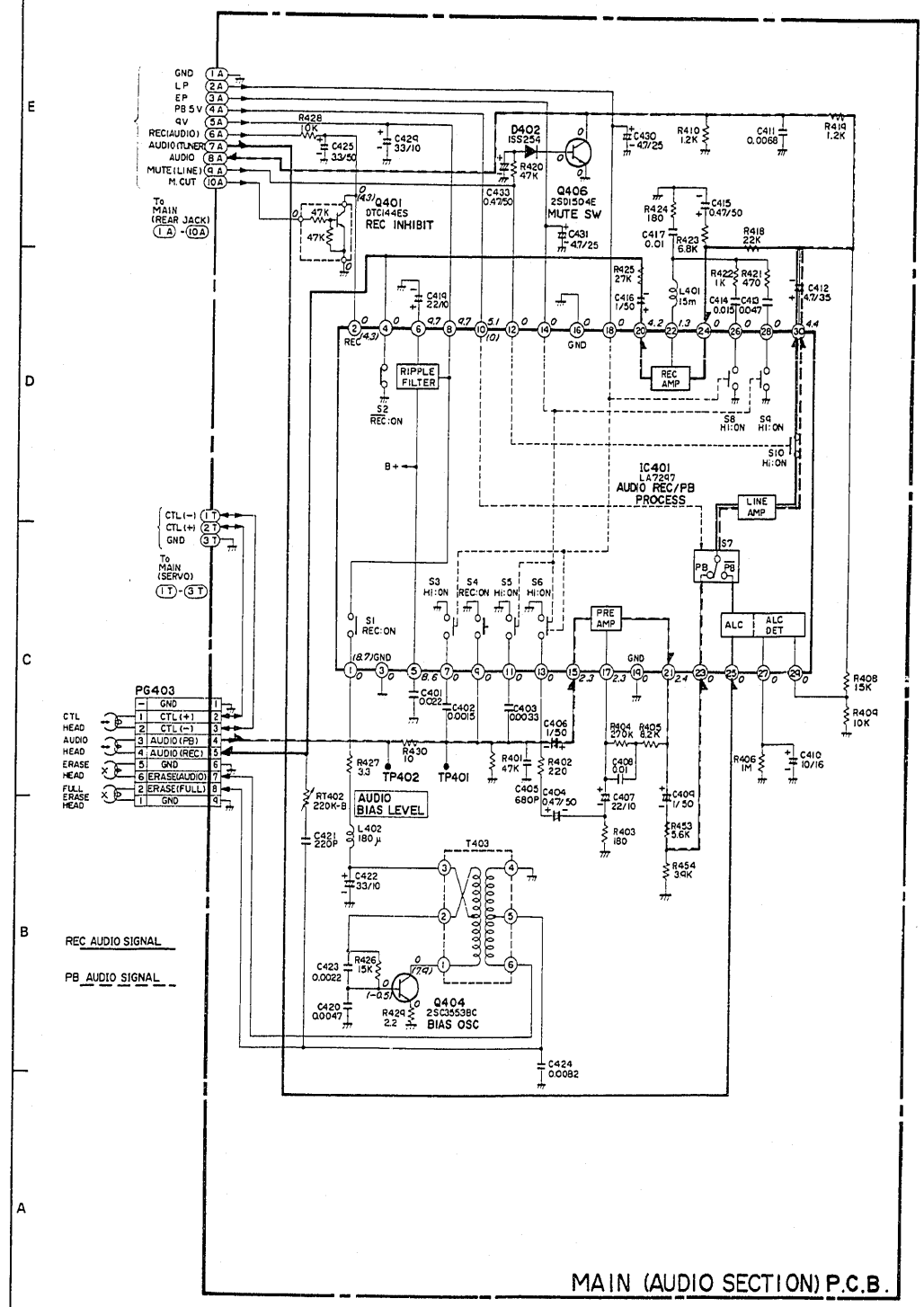


| SCHEMATIC DIAGRAM | PAGE |
|---|---|
| U-V TUNER | 5-6 |
| IF | 5-8 |
| RF CONVERTER | 5-9 |
| SENSOR | 5-9 |
| FRONT SWITCH | 5-10 |
| PRE/REC AMP | 5-11 |
| SYS.CON./TIMER | 5-12 |
| AUDIO | 5-14 |
| CLY.MOTOR DRIVE | 5-15 |
| CAPSTAN MOTOR | 5-15 |
| REAR JACK | 5-18 |
| LUMINANCE/CHROMA | 5-22 |
| POWER SUPPLY | 5-26 |
| 14V REGULATOR | 5-26 |

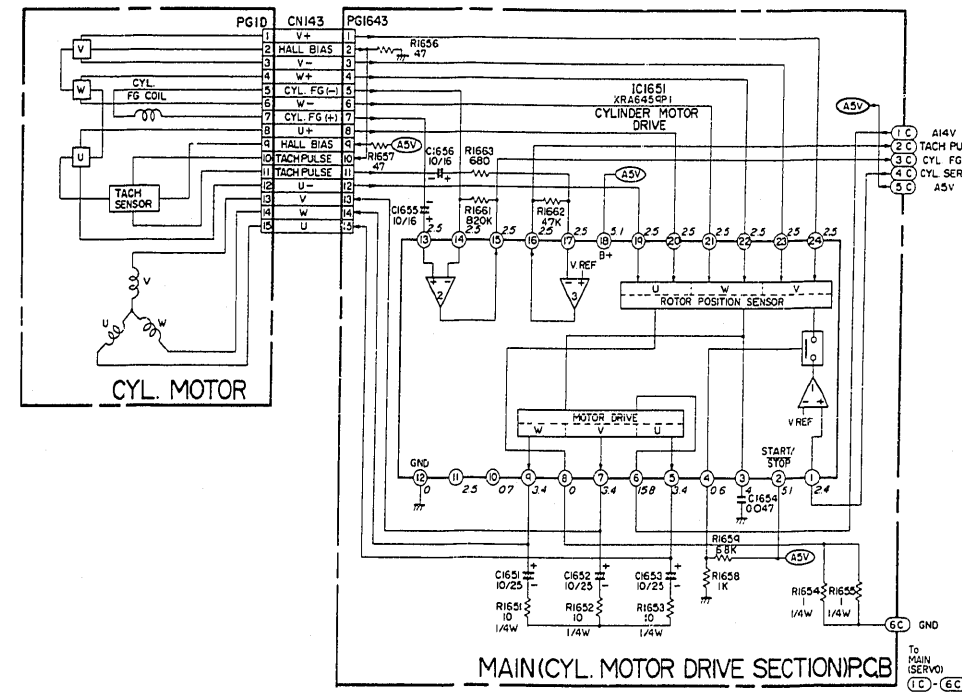
# SYS. CON./TIMER SCHEMATIC DIAGRAM



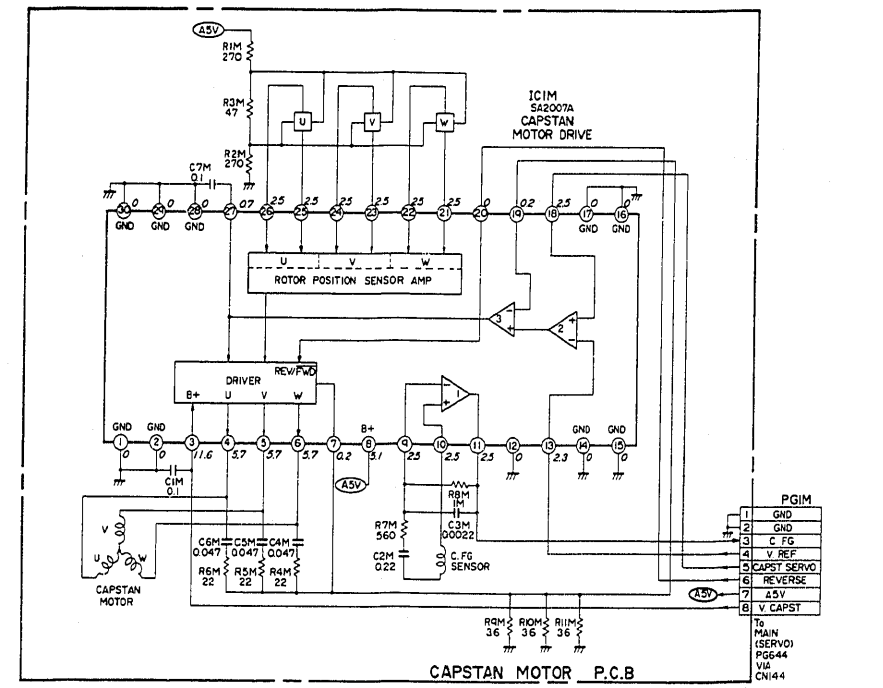
## AUDIO SCHEMATIC DIAGRAM



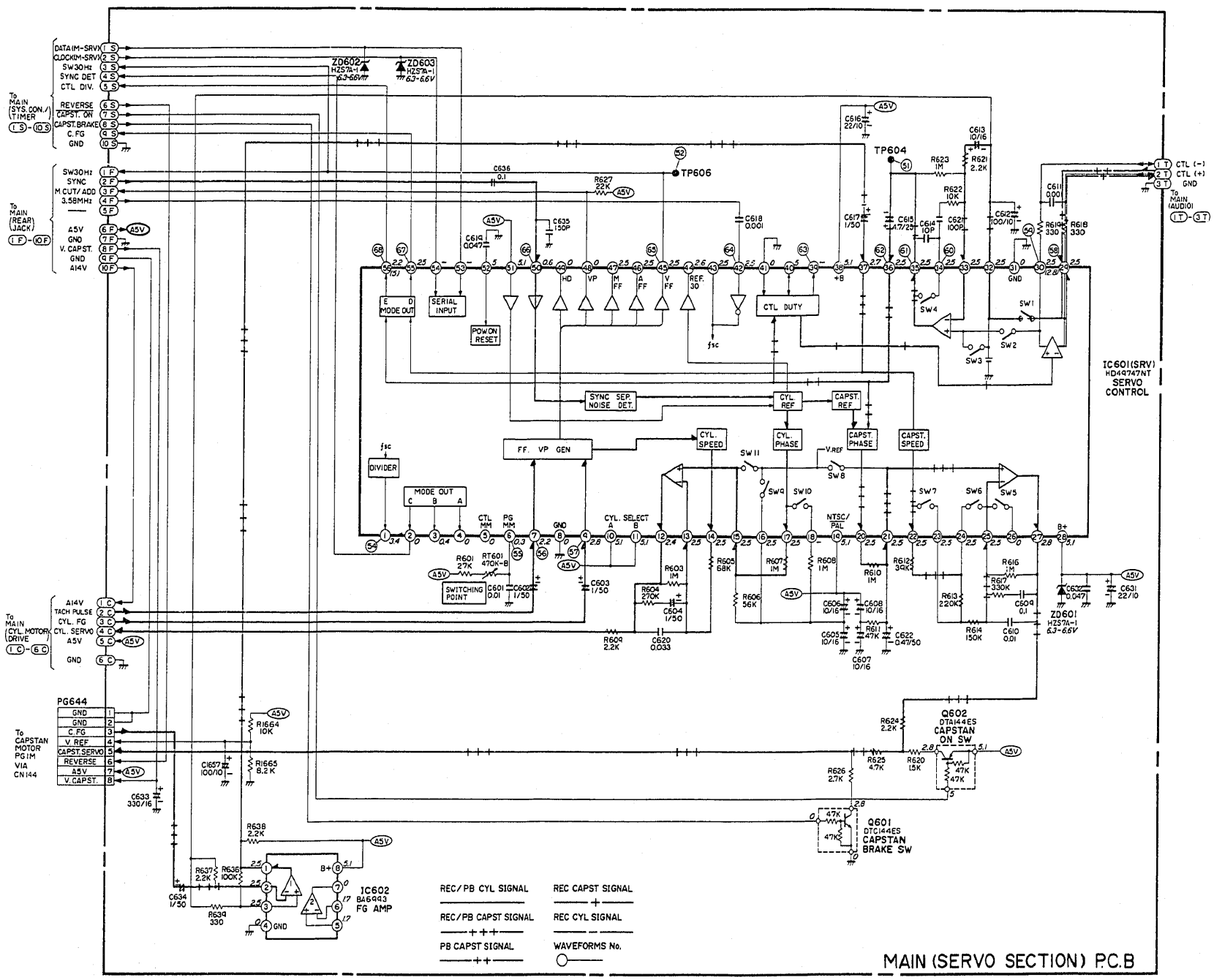

## CYL. MOTOR DRIVE SCHEMATIC DIAGRAM

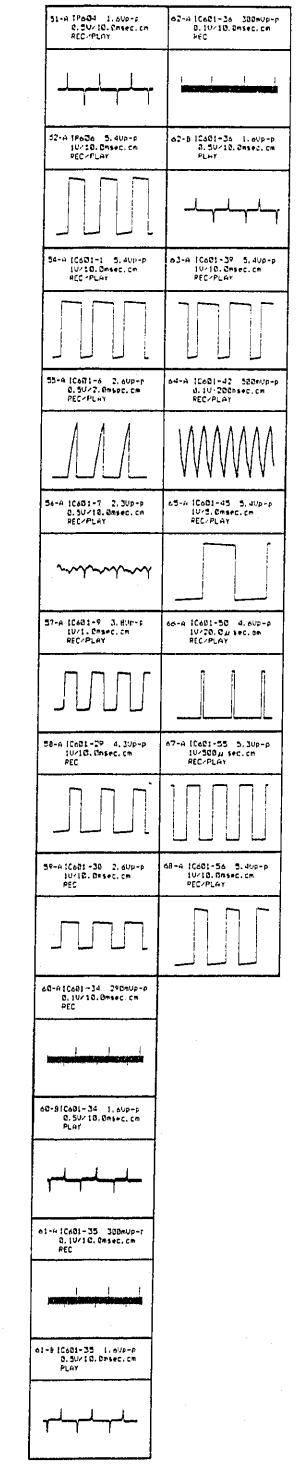



## CAPSTAN MOTOR SCHEMATIC DIAGRAM

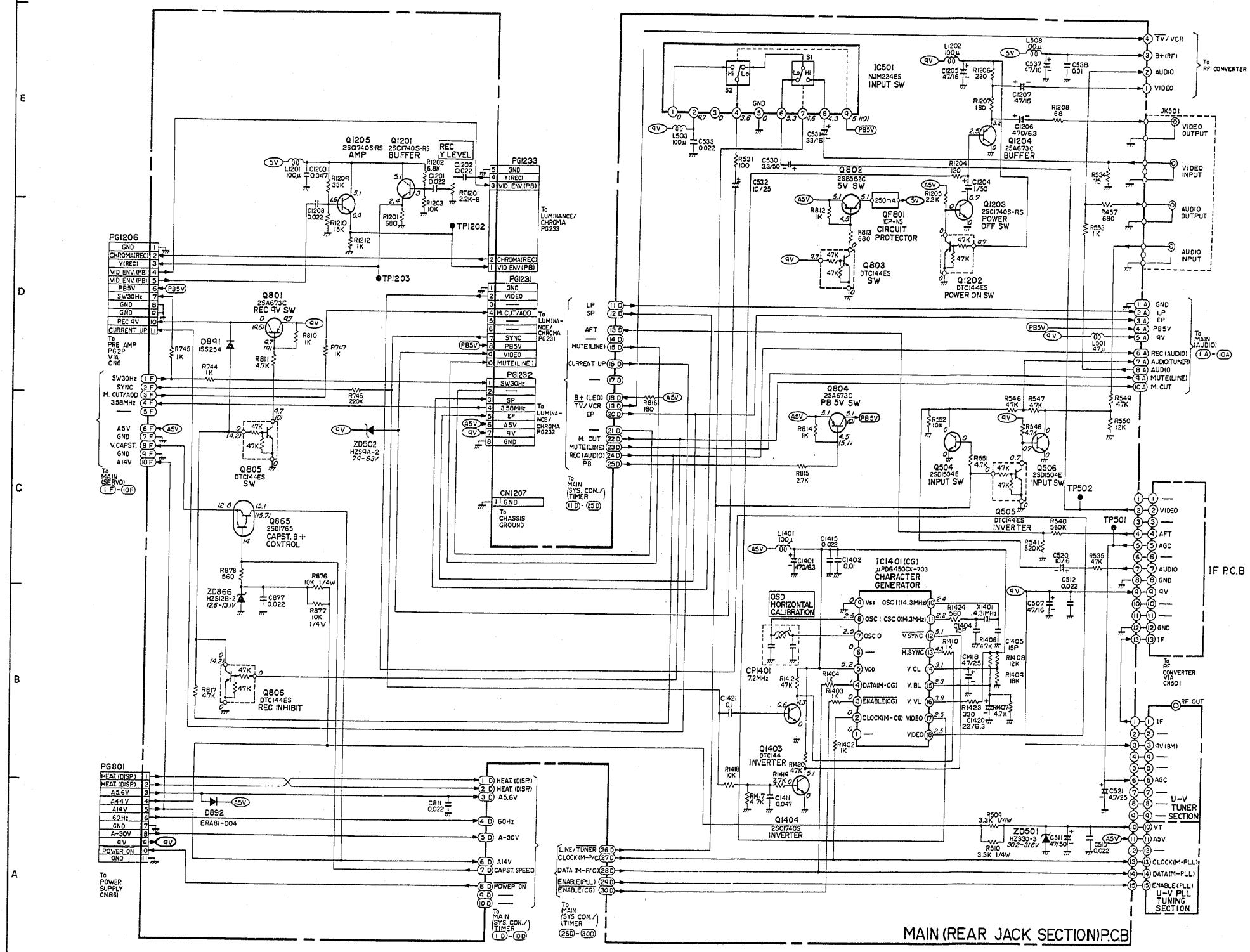


# SERVO SCHEMATIC DIAGRAM



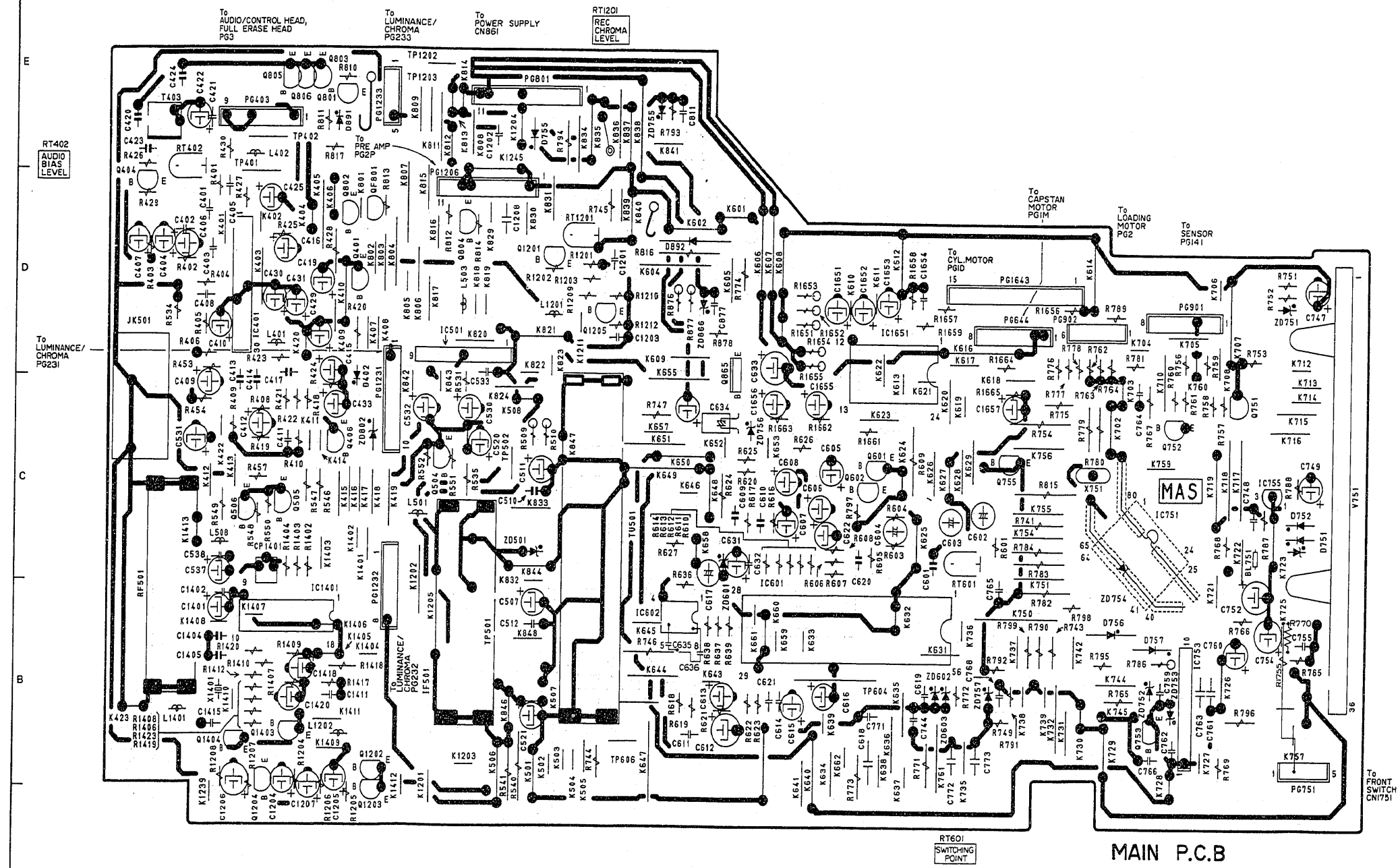



# REAR JACK SCHEMATIC DIAGRAM

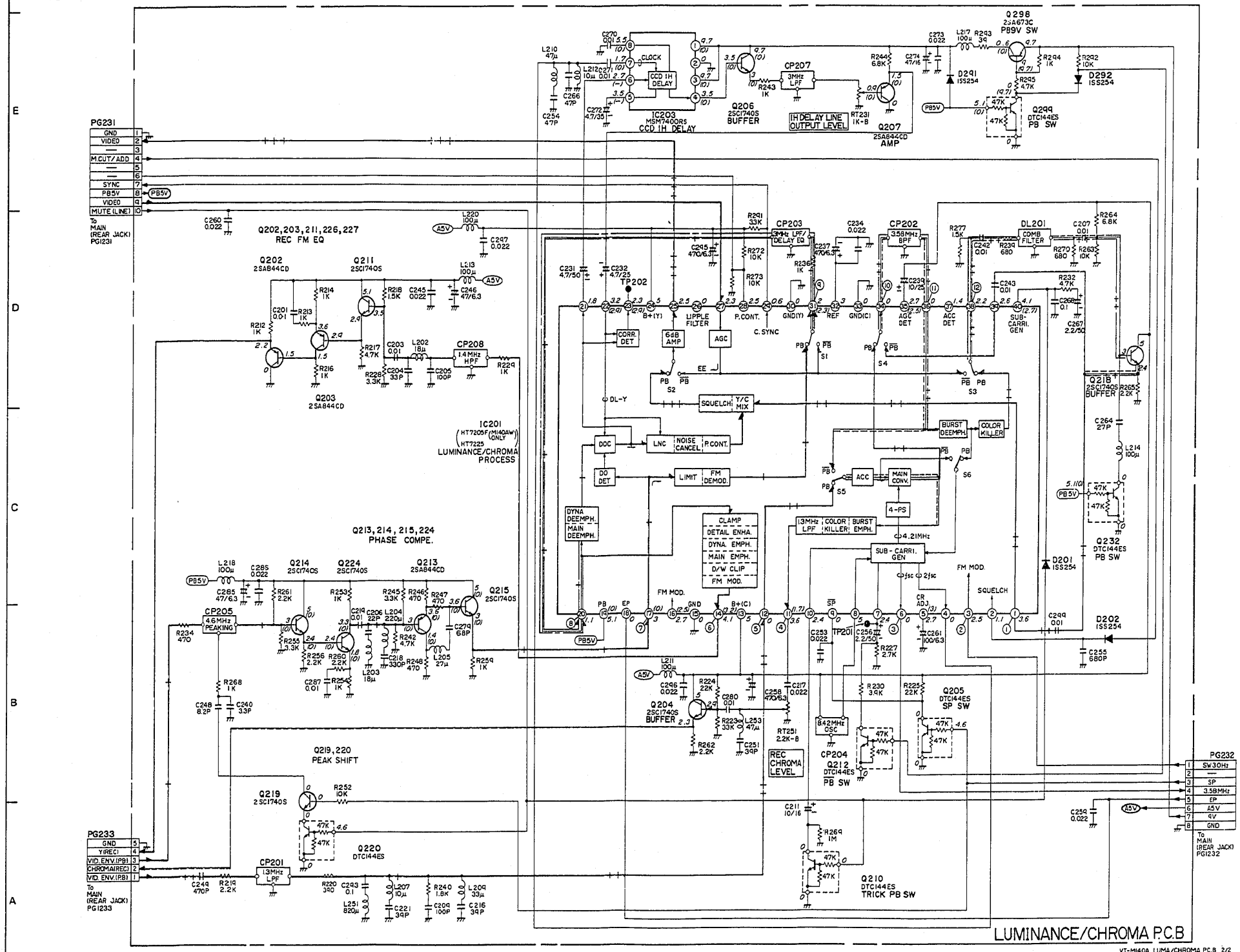



REAR JACK 5-18 5-19 REAR JACK

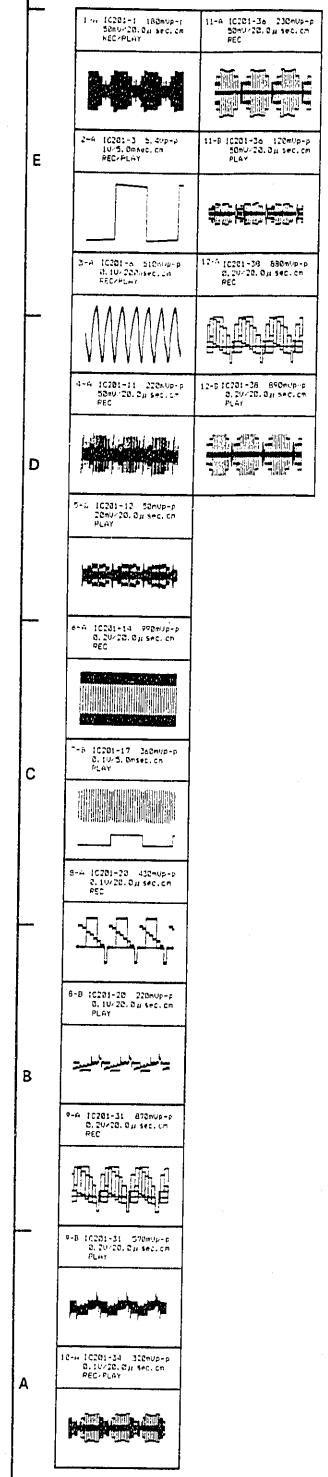
# MAIN CIRCUIT BOARD DIAGRAM

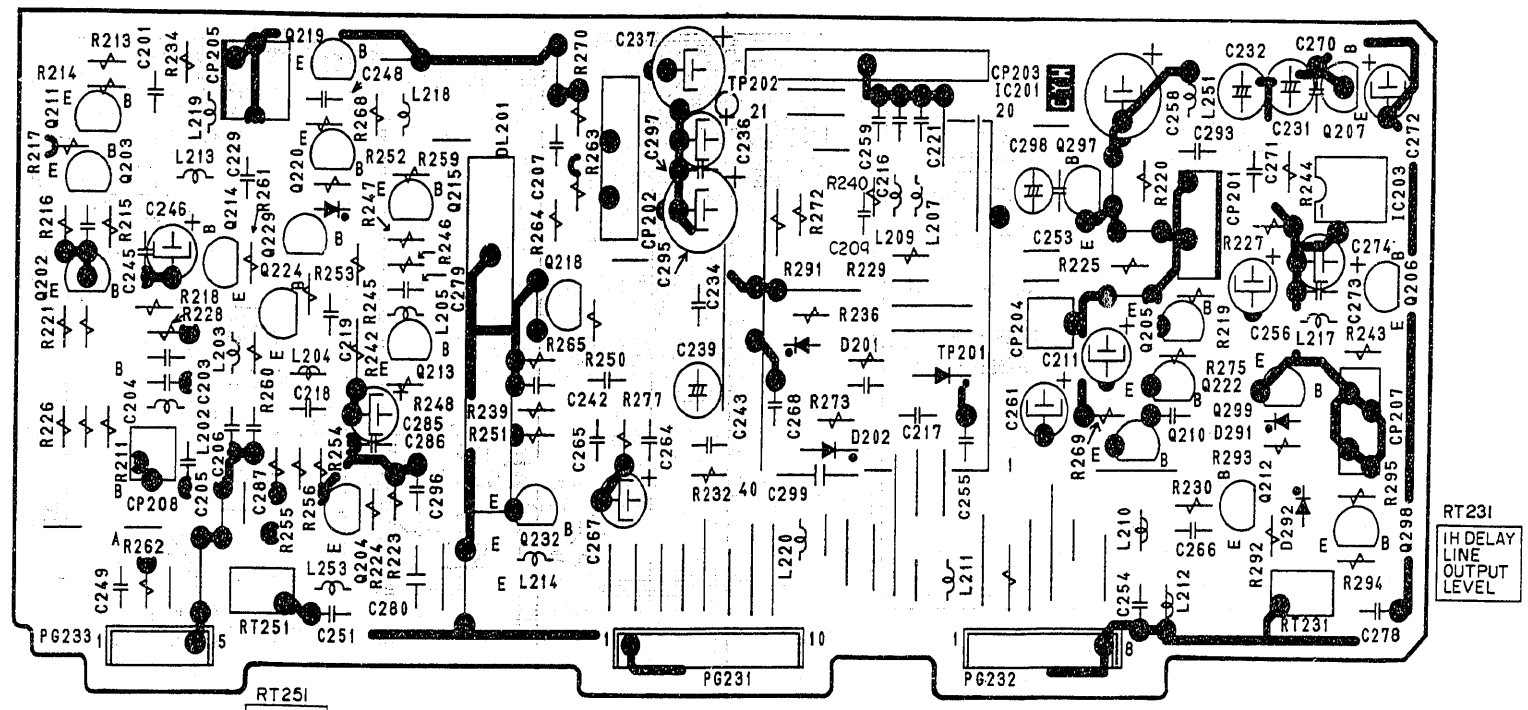


# LUMINANCE/CHROMA SCHEMATIC DIAGRAM



# LUMINANCE/CHROMA CIRCUIT BOARD DIAGRAM






LUMINANCE / CHROMA P.C.B


| SCHEMATIC DIAGRAM | PAGE |
|---|---|
| U-V TUNER | 5-6 |
| IF | 5-8 |
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| SENSOR | 5-9 |
| FRONT SWITCH | 5-10 |
| PRE/REC AMP | 5-11 |
| SYS.CON./TIMER | 5-12 |
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| CLY.MOTOR DRIVE | 5-15 |
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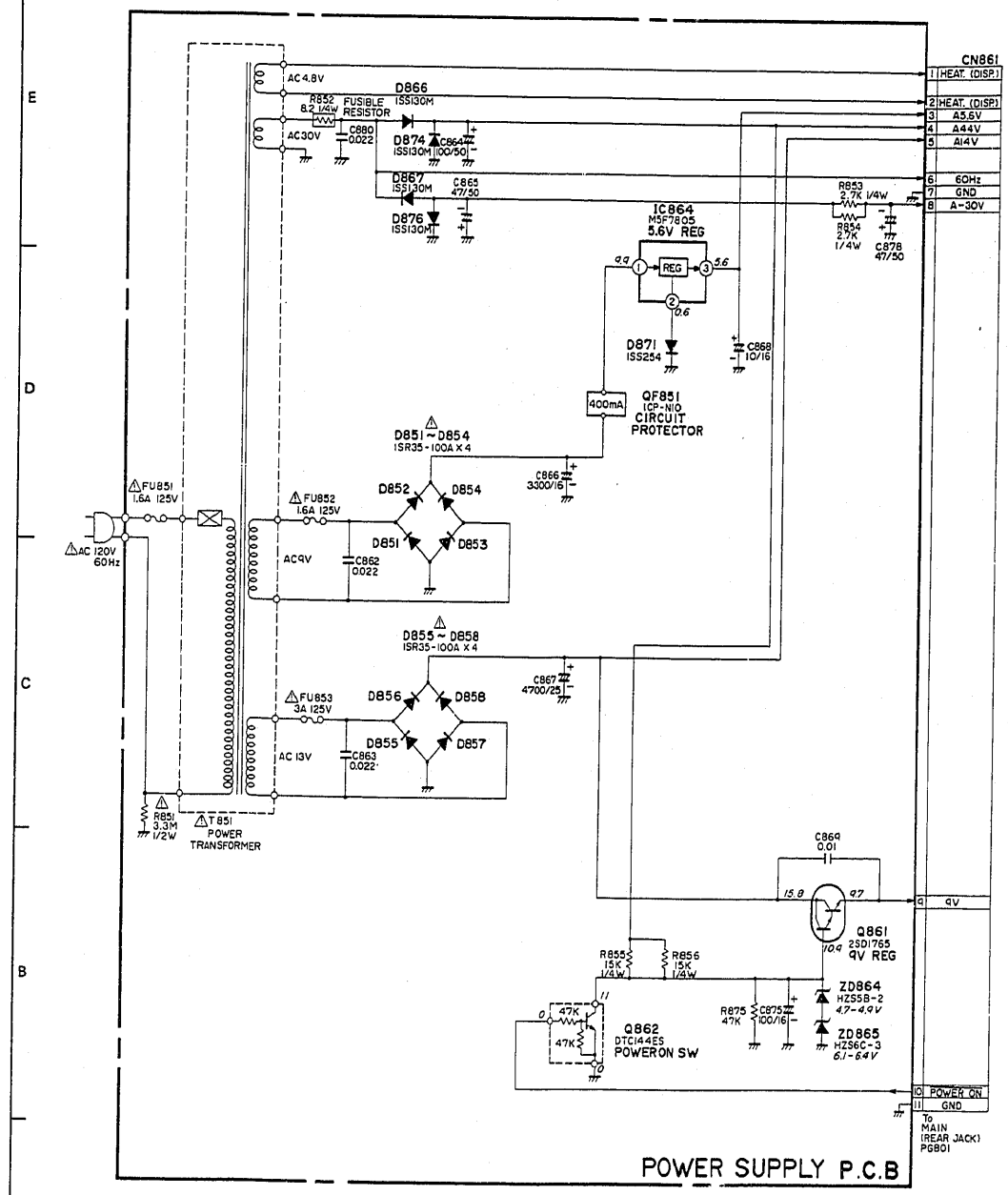
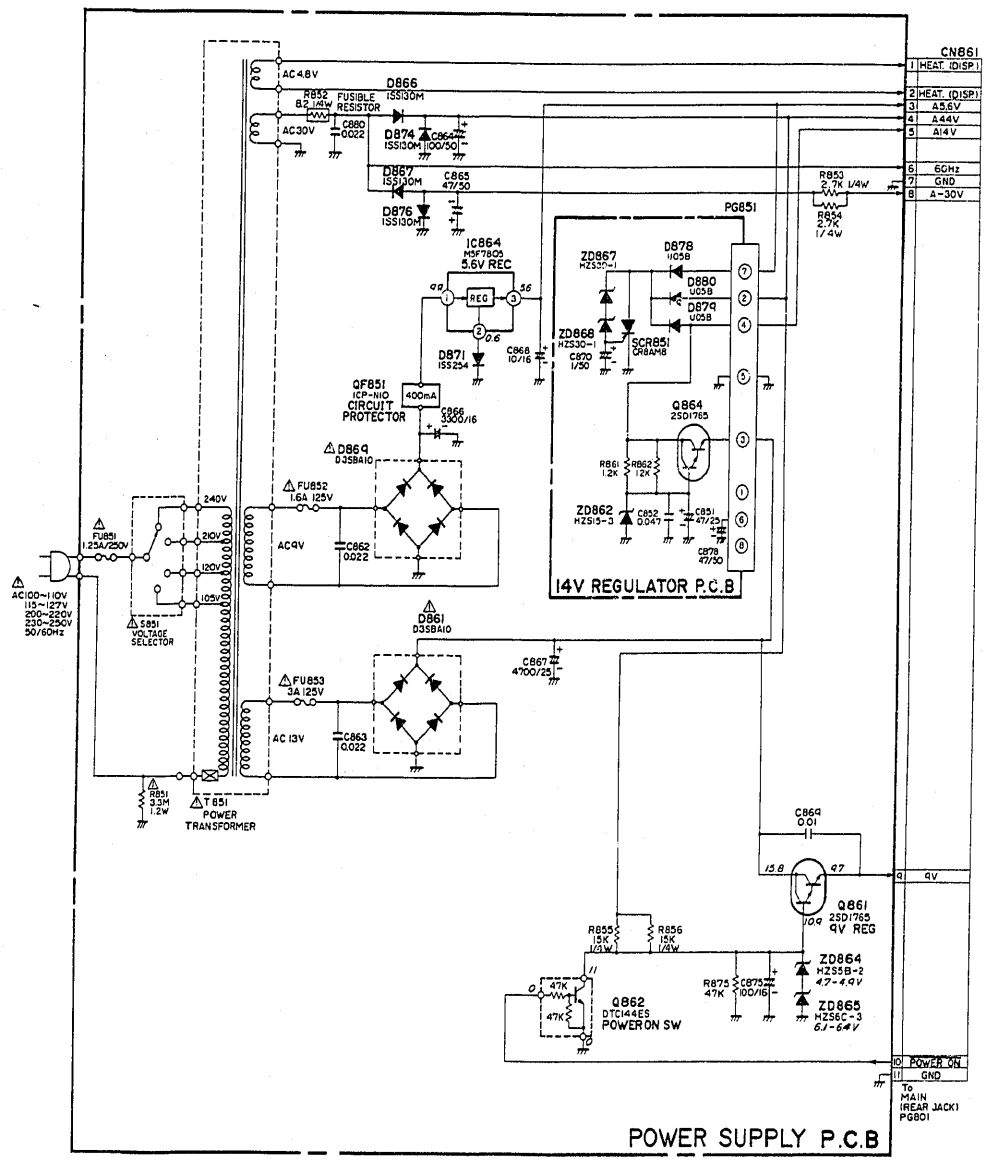
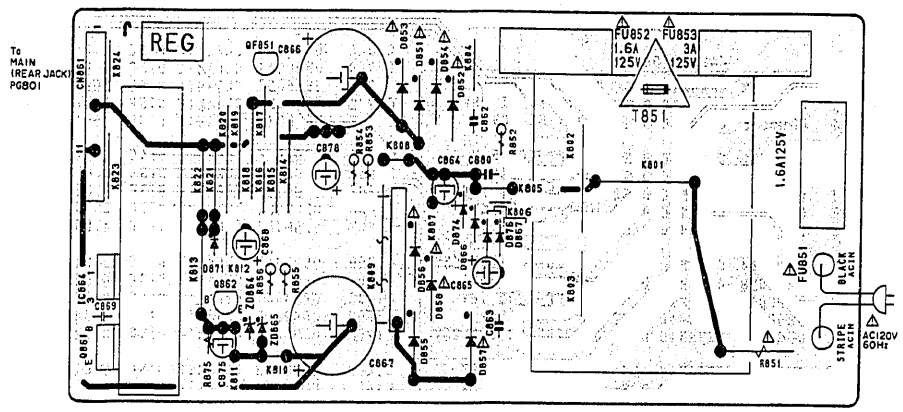
## POWER SUPPLY SCHEMATIC DIAGRAM (VT-M140A/M141A/M131A)




## POWER SUPPLY SCHEMATIC DIAGRAM (VT-M140AW)

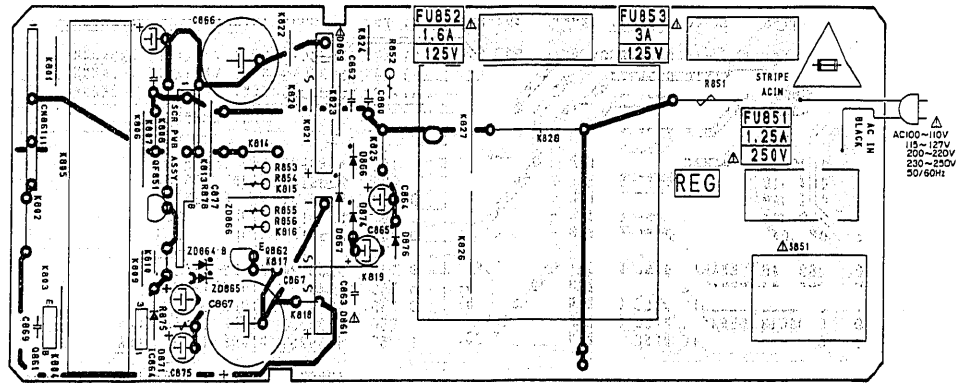


## POWER SUPPLY CIRCUIT BOARD DIAGRAM (VT-M140A/M141A/M131A)



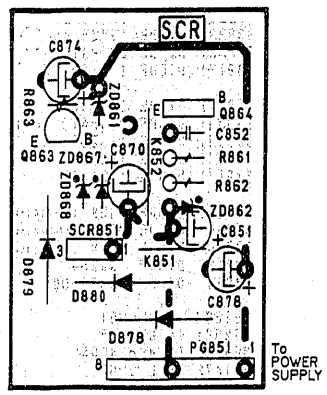

POWER SUPPLY P.C.B

## POWER SUPPLY CIRCUIT BOARD DIAGRAM (VT-M140AW)




POWER SUPPLY P.C.B

## 14V REGULATOR CIRCUIT BOARD DIAGRAMS




14V REGULATOR P.C.B


| SCHEMATIC DIAGRAM | PAGE |
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| U-V TUNER | 5-6 |
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| RF CONVERTER | 5-9 |
| SENSOR | 5-9 |
| FRONT SWITCH | 5-10 |
| PRE/REC AMP | 5-11 |
| SYS.CON./TIMER | 5-12 |
| AUDIO | 5-14 |
| CLY.MOTOR DRIVE | 5-15 |
| CAPSTAN MOTOR | 5-15 |
| REAR JACK | 5-18 |
| LUMINANCE/CHROMA | 5-22 |
| POWER SUPPLY | 5-26 |
| 14V REGULATOR | 5-26 |

# REPLACEMENT PARTS LIST
# ELECTRICAL PARTS LIST

| SYMBOL-No | P-No | DESCRIPTION |
|---|---|---|
| | | **CAPACITORS** |
| C 201 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 203 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 204 | 0890015 | CERAMIC DISC 33PF+-5% 50V |
| C 205 | 0890022 | CERAMIC DISC 100PF+-10% 50V |
| C 206 | 0890013 | CERAMIC DISC 22PF+-5% 50V |
| C 207 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 209 | 0890022 | CERAMIC DISC 100PF+-10% 50V |
| C 216 | 0890016 | CERAMIC DISC 39PF+-50% 50V |
| C 217 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 218 | 0890028 | CERAMIC DISC 330PF+-10% 50V |
| C 219 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 221 | 0890016 | CERAMIC DISC 39PF+-50% 50V |
| C 234 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 242 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 243 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 244 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 248 | 0890007 | CERAMIC DISC 8.2PF+-10% 50V |
| C 249 | 0890031 | CERAMIC DISC 470PF+-10% 50V |
| C 251 | 0890016 | CERAMIC DISC 39PF+-50% 50V |
| C 253 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 254 | 0890017 | CERAMIC DISC 47PF+-5% 50V |
| C 255 | 0890033 | CERAMIC DISC 680PF+-10% 50V |
| C 259 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 260 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 264 | 0890014 | CERAMIC DISC 27PF+-50% 50V |
| C 266 | 0890017 | CERAMIC DISC 47PF+-5% 50V |
| C 268 | 0890046 | CERAMIC DISC 0.1UF+80-20% 50V |
| C 270 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 271 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 279 | 0890019 | CERAMIC DISC 68PF+-50% 50V |
| C 280 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 286 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 287 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 293 | 0890046 | CERAMIC DISC 0.1UF+80-20% 50V |
| C 296 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 297 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 299 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 401 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 402 | 0890036 | CERAMIC DISC 1500PF+-20% 16V |
| C 403 | 0890038 | CERAMIC DISC 3300PF+-20% 16V |
| C 405 | 0890033 | CERAMIC DISC 680PF+-10% 50V |
| C 408 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 411 | 0890041 | CERAMIC DISC 6800PF+-20% 16V |
| C 421 | 0890026 | CERAMIC DISC 220PF+-10% 50V |
| C 424 | 0204271 | POLYESTER FILM 8200PF+-5% 100V |
| C 512 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 533 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 538 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 611 | 0890035 | CERAMIC DISC 1000PF 50V |
| C 614 | 0890008 | CERAMIC DISC 10PF+-5% 50V |
| C 618 | 0890035 | CERAMIC DISC 1000PF 50V |
| C 619 | 0890045 | CERAMIC DISC 0.047UF+80-20% 50V |
| C 621 | 0890022 | CERAMIC DISC 100PF+-10% 50V |
| C 632 | 0890045 | CERAMIC DISC 0.047UF+80-20% 50V |
| C 744 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 748 | 0890045 | CERAMIC DISC 0.047UF+80-20% 50V |
| C 755 | 0890045 | CERAMIC DISC 0.047UF+80-20% 50V |
| C 759 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 761 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 762 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 763 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 764 | 0890037 | CERAMIC DISC 2200PF+-20% 16V |
| C 765 | 0890045 | CERAMIC DISC 0.047UF+80-20% 50V |
| C 766 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C 768 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 771 | 0890032 | CERAMIC DISE 560PF+-10% 50V |
| C 772 | 0890032 | CERAMIC DISE 560PF+-10% 50V |
| C 773 | 0890032 | CERAMIC DISE 560PF+-10% 50V |
| C 811 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C 862 | 0890102 | CERAMIC DISC 0.022UF+80-20% 50V |
| C 863 | 0890102 | CERAMIC DISC 0.022UF+80-20% 50V |
| C 866 | 0256864 | ELECTROLYTIC 3300UF 16V |
| C 867 | 0256787 | ELECTROLYTIC 4700UF 25V |
| C 869 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C1201 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C1202 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C1203 | 0890045 | CERAMIC DISC 0.047UF+80-20% 50V |
| C1208 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C1402 | 0890043 | CERAMIC DISC 0.01UF+-20% 16V |
| C1404 | 0208444 | CERAMIC DISC 15PF+-5% 50V |
| C1405 | 0208444 | CERAMIC DISC 15PF+-5% 50V |
| C1411 | 0890045 | CERAMIC DISC 0.047UF+80-20% 50V |
| C1415 | 0890044 | CERAMIC DISC 0.022UF+80-20% 25V |
| C1654 | 0890045 | CERAMIC DISC 0.047UF+80-20% 50V |
| | | **RESISTORS** |
| RT 231 | 5030084 | TRIMMER 1KOHM |
| RT 251 | 5030085 | TRIMMER 2.2KOHM |
| RT 402 | 5030012 | SEMI VARIABLE 220KOHM |
| RT 601 | 5030013 | SEMI VARIABLE 470KOHM |
| RT1201 | 5030005 | SEMI VARIABLE 2.2KOHM |
| | | **SEMI-CONDUCTORS** |
| D 141 | 5380933 | LED GL-451 |
| D 201 | 5339131 | DIODE 1SS254 |
| D 202 | 5339131 | DIODE 1SS254 |
| D 291 | 5339131 | DIODE 1SS254 |
| D 402 | 5339131 | DIODE 1SS254 |
| D 751 | 5339131 | DIODE 1SS254 |
| D 752 | 5339131 | DIODE 1SS254 |
| D 755 | 5339171 | DIODE 1SS130 |
| D 756 | 5339231 | DIODE 1SR35-100A |
| D 757 | 5339231 | DIODE 1SR35-100A |
| △D 851 | 5339231 | DIODE 1SR35-100A (VT-M140A/M141A/M131A) |
| △D 852 | 5339231 | DIODE 1SR35-100A (VT-M140A/M141A/M131A) |
| △D 853 | 5339231 | DIODE 1SR35-100A (VT-M140A/M141A/M131A) |
| △D 854 | 5339231 | DIODE 1SR35-100A (VT-M140A/M141A/M131A) |
| △D 855 | 5339231 | DIODE 1SR35-100A (VT-M140A/M141A/M131A) |
| △D 856 | 5339231 | DIODE 1SR35-100A (VT-M140A/M141A/M131A) |
| △D 857 | 5339231 | DIODE 1SR35-100A (VT-M140A/M141A/M131A) |
| △D 858 | 5339231 | DIODE 1SR35-100A (VT-M140A/M141A/M131A) |
| △D 861 | 5333351 | DIODE D3SBA10 (VT-M140AW) |
| D 866 | 5339171 | DIODE 1SS130 |
| D 867 | 5339171 | DIODE 1SS130 |
| △D 869 | 5333351 | DIODE D3SBA10 (VT-M140AW) |
| D 871 | 5339131 | DIODE 1SS254 |
| D 874 | 5339171 | DIODE 1SS130 |
| D 876 | 5339171 | DIODE 1SS130 |
| D 878 | 5330561 | DIODE U05B (VT-M140AW) |
| D 879 | 5330501 | DIODE U05B (VT-M140AW) |
| D 880 | 5330501 | DIODE U05B (VT-M140AW) |
| D 891 | 5339131 | DIODE 1SS254 |
| D 892 | 5332541 | DIODE ERA81-004 |
| IC 141 | 5391282 | IC DN6851 |
| IC 201 | 1372531 | IC HT7225 |
| IC 203 | 1360231 | IC MSM7400RS |
| IC 401 | 1341472 | IC LA7297 |
| IC 501 | 1342031 | IC NJM2248S |



| SYMBOL-No | P-No | DESCRIPTION |
|---|---|---|
| IC 601 | 1360391 | IC HD49747NT |
| IC 602 | 5367221 | IC BA6993 |
| IC 751 | 1355153 | IC CXP50116-142Q |
| IC 753 | 5300795 | IC XRA6209U4 |
| IC 755 | 1341193 | IC PST529I |
| IC 864 | 1341511 | IC M5F7805L |
| IC1401 | 1361443 | IC UPD6450CX-703 |
| IC1651 | 1360072 | IC XRA6459P1 |
| IC1751 | 1388711 | PWB ASSY SBX1644 |
| Q 141 | 5324661 | TRANSISTOR PT-483F1 |
| Q 142 | 5324661 | TRANSISTOR PT-483F1 |
| Q 202 | 5327021 | TRANSISTOR 2SA844CD |
| Q 203 | 5327021 | TRANSISTOR 2SA844CD |
| Q 204 | 5327063 | TRANSISTOR 2SC1740S |
| Q 205 | 5327073 | TRANSISTOR DTC144ES |
| Q 206 | 5327063 | TRANSISTOR 2SC1740S |
| Q 207 | 5327021 | TRANSISTOR 2SA844CD |
| Q 210 | 5327073 | TRANSISTOR DTC144ES |
| Q 211 | 5327063 | TRANSISTOR 2SC1740S |
| Q 212 | 5327073 | TRANSISTOR DTC144ES |
| Q 213 | 5327021 | TRANSISTOR 2SA844CD |
| Q 214 | 5327063 | TRANSISTOR 2SC1740S |
| Q 215 | 5327063 | TRANSISTOR 2SC1740S |
| Q 218 | 5327063 | TRANSISTOR 2SC1740S |
| Q 219 | 5327063 | TRANSISTOR 2SC1740S |
| Q 220 | 5327073 | TRANSISTOR DTC144ES |
| Q 224 | 5327063 | TRANSISTOR 2SC1740S |
| Q 232 | 5327073 | TRANSISTOR DTC144ES |
| Q 298 | 5327031 | TRANSISTOR 2SA673C |
| Q 299 | 5327073 | TRANSISTOR DTC144ES |
| Q 401 | 5327073 | TRANSISTOR DTC144ES |
| Q 404 | 5327101 | TRANSISTOR 2SC3553BC |
| Q 406 | 5327091 | TRANSISTOR 2SD1504E |
| Q 504 | 5327091 | TRANSISTOR 2SD1504E |
| Q 505 | 5327073 | TRANSISTOR DTC144ES |
| Q 506 | 5327091 | TRANSISTOR 2SD1504E |
| Q 601 | 5327073 | TRANSISTOR DTC144ES |
| Q 602 | 5327074 | TRANSISTOR DTA144ES-T |
| Q 751 | 5327073 | TRANSISTOR DTC144ES |
| Q 752 | 5327073 | TRANSISTOR DTC144ES |
| Q 753 | 5327073 | TRANSISTOR DTC144ES |
| Q 755 | 5327073 | TRANSISTOR DTC144ES |
| Q 801 | 5327031 | TRANSISTOR 2SA673C |
| Q 802 | 5327131 | TRANSISTOR 2SB562C |
| Q 803 | 5327073 | TRANSISTOR DTC144ES |
| Q 804 | 5327031 | TRANSISTOR 2SA673C |
| Q 805 | 5327073 | TRANSISTOR DTC144ES |
| Q 806 | 5327073 | TRANSISTOR DTC144ES |
| Q 861 | 1321341 | TRANSISTOR 2SD1765 |
| Q 862 | 5327073 | TRANSISTOR DTC144ES |
| Q 864 | 1321341 | TRANSISTOR 2SD1765 (VT-M140AW) |
| Q 865 | 1321341 | TRANSISTOR 2SD1765 |
| Q1201 | 5327063 | TRANSISTOR 2SC1740S |
| Q1202 | 5327073 | TRANSISTOR DTC144ES |
| Q1203 | 5327063 | TRANSISTOR 2SC1740S |
| Q1204 | 5327031 | TRANSISTOR 2SA673C |
| Q1205 | 5327063 | TRANSISTOR 2SC1740S |
| Q1403 | 5327073 | TRANSISTOR DTC144ES |
| Q1404 | 5327063 | TRANSISTOR 2SC1740S |
| QF 801 | 5721941 | IC PROTECTOR |
| QF 851 | 5721943 | IC PROTECTOR |
| ZD 501 | 5339288 | ZENER DIODE HZS30-3 |
| ZD 502 | 5339271 | ZENER DIODE HZS9A2 |
| ZD 862 | 5339274 | ZENER DIODE HZS15-3 (VT-M140AW) |
| ZD 864 | 5339296 | ZENER DIODE HZS5B2 |
| ZD 865 | 5339284 | ZENER DIODE HZS6-C3 |
| ZD 866 | 5339293 | ZENER DIODE HZS12B2 |
| ZD 867 | 5339256 | ZENER DIODE HZS30 (VT-M140AW) |
| ZD 868 | 5339256 | ZENER DIODE HZS30 (VT-M140AW) |
| | | **TRANSFORMERS** |
| T 403 | 5262545 | OSCILLATOR.BIAS |
| △T 851 | 5214361 | TRANSFORMER.POWER (VT-M140A/M141A/M131A) |
| △T 851 | 5214183 | TRANSFORMER.POWER (VT-M140AW) |
| | | **COILS** |
| L 202 | 5159144 | CHOKE COIL 18UH |
| L 203 | 5159144 | CHOKE COIL 18UH |
| L 204 | 5159158 | CHOKE COIL 220UH |
| L 205 | 5159146 | CHOKE COIL 27UH |
| L 207 | 5159141 | CHOKE COIL 10UH |
| L 209 | 5159147 | CHOKE COIL 33UH |
| L 210 | 5159149 | CHOKE COIL 47UH |
| L 211 | 5159077 | CHOKE COIL 100UH+-10% |
| L 212 | 5159141 | CHOKE COIL 10UH |
| L 213 | 5159077 | CHOKE COIL 100UH+-10% |
| L 214 | 5121184 | COIL 100UH |
| L 217 | 5159077 | CHOKE COIL 100UH+-10% |
| L 218 | 5159077 | CHOKE COIL 100UH+-10% |
| L 220 | 5159077 | CHOKE COIL 100UH+-10% |
| L 251 | 5159089 | CHOKE COIL 820UH+-10% |
| L 253 | 5159149 | CHOKE COIL 47UH |
| L 401 | 5159114 | COIL 15MH |
| L 402 | 5159157 | CHOKE COIL 180UH |
| L 501 | 5159073 | CHOKE COIL 47UH+-10% |
| L 503 | 5159077 | CHOKE COIL 100UH+-10% |
| L 508 | 5159154 | CHOKE COIL 100UH |
| L1201 | 5159077 | CHOKE COIL 100UH+-10% |
| L1202 | 5159077 | CHOKE COIL 100UH+-10% |
| L1401 | 5159077 | CHOKE COIL 100UH+-10% |
| | | **CRYSTALS** |
| X 751 | 5778071 | CRYSTAL |
| X1401 | 5778311 | CRYSTAL |
| | | **MISCELLANEOUS** |
| BL 751 | 5272373 | LINE FILTER |
| CP 201 | 5164733 | LOW PASS FILTER |
| CP 202 | 5165121 | BAND PASS FILTER |
| CP 203 | 5164705 | FILTER,LOW PASS |
| CP 204 | 5165092 | TRAP FILTER |
| CP 205 | 5163591 | BAND PASS FILTER |
| CP 207 | 5163634 | LOW PASS FILTER |
| CP 208 | 5162754 | HIGHT PASS FILTER |
| CP1401 | 5163372 | FILTER |
| DL 201 | 5786331 | DELAY LINE |
| △FU 851 | 5721405 | FUSE 1.6A (VT-M140A/M141A/M131A) |
| △FU 851 | 5721479 | FUSE 1.25A (VT-M140AW) |
| △FU 852 | 5721405 | FUSE 1.6A |
| △FU 853 | 5721408 | FUSE 125V 3A |
| JK 501 | 5696031 | PLATE,JACK |
| S 141 | 5635321 | SWITCH |
| S 142 | 5635331 | SWITCH |
| △S 851 | 5605341 | SWITCH (VT-M140AW) |
| S1751 | 5635061 | SWITCH |
| S1752 | 5635061 | SWITCH |
| S1753 | 5635061 | SWITCH |
| S1754 | 5635061 | SWITCH |
| S1755 | 5635061 | SWITCH |
| S1756 | 5635061 | SWITCH |
| S1757 | 5635061 | SWITCH |
| S1758 | 5635061 | SWITCH |

| SYMBOL-No | P-No | DESCRIPTION |
|---|---|---|
| TU 501 | 5582161 | TUNER UNIT |
| IF 501 | 5583822 | IF UNIT |
| RF 501 | 5589241 | RF CONVERTER |
| V 751 | 5315175 | FLUORESCET INDICATOR TUBE |
| SCR 851 | 5390191 | THERMISTOR (VT-M140AW) |

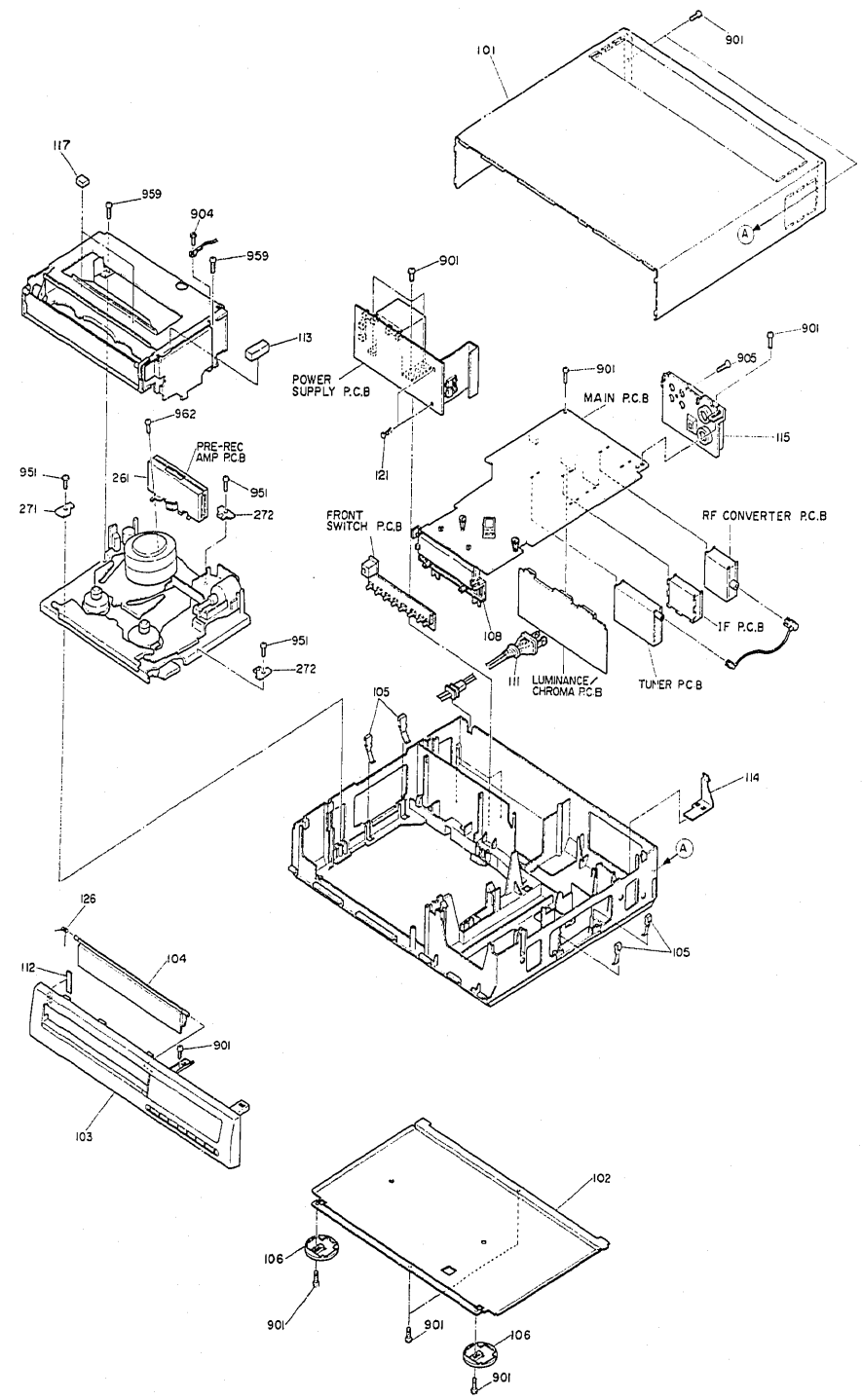
# MECHANICAL PARTS LIST

| SYMBOL-No | P-No | DESCRIPTION |
|---|---|---|
| | | FOR FINAL ASSEMBLY |
| 101 | 6006923 | COVER,TOP |
| 102 | 6006935 | COVER,BOTTOM |
| 103 | 6487541 | PANEL,FRONT (M140A ONLY) |
| 103 | 6487542 | PANEL,FRONT (M141A ONLY) |
| 103 | 6487543 | PANEL,FRONT (M131A ONLY) |
| 103 | 6487544 | PANEL,FRONT (M141AW ONLY) |
| 104 | 6487406 | DOOR,CASSETTE |
| 105 | 6527683 | SPRING |
| ⚠ 106 | 6442472 | INSULATOR |
| 111 | 5850753 | CORD,POWER |
| 112 | 7708382 | STOPPER |
| 113 | 4330231 | FILT |
| 114 | 6528141 | PLATE |
| 115 | 6485194 | PLATE,REAR |
| 117 | 6562611 | CUSHION,RUBBER |
| 121 | 6802271 | BRACKET |
| 126 | 6552333 | SPRING |
| 202 | 6915922 | SCREW |
| 203 | 7469871 | BASE |
| 204 | 5434061 | HEAD |
| 205 | 6304906 | SPRING |
| 206 | 6522752 | SPRING |
| 207 | 7785673 | NUT |
| 208 | 6820341 | ARM |
| 209 | 6555501 | SPRING |
| 210 | 6416121 | SPRING |
| 211 | 7789123 | POLYSLIDER WASHER |
| 212 | 6416131 | REEL TABLE,TAKE UP |
| 213 | 7789122 | POLYSLIDER WASHER |
| 214 | 6384352 | ARM,PRESSER ROLLER |
| 215 | 6805041 | SLIDER BLOCK |
| 216 | 7412822 | PLATE |
| 217 | 7429651 | GEAR,LOADING(L) |
| 218 | 7429661 | GEAR,LOADING(R) |
| 219 | 6911551 | GUIDE ROLLER BASE(IN) |
| 220 | 6424261 | ROLLER,GUIDE |
| 221 | 6911572 | GUIDE ROLLER BASE(OUT) |
| 222 | 6897071 | BASE |
| 223 | 5445851 | HEAD FULL ERASE |
| 225 | 4508237 | GUIDE,TAPE |
| 226 | 6555431 | SPRING |
| 227 | 7413665 | HOLDER-BAND |
| 228 | 7412863 | ARM |
| 229 | 6555446 | SPRING |
| 230 | 6897265 | BRACKET |
| 231 | 6896752 | ARM |
| 232 | 6555061 | SPRING |
| 233 | 6820351 | ARM |
| 235 | 7468853 | BLOCK,LOADING |
| 236 | 7398631 | BRACKET |
| 237 | 7412881 | ARM |
| 238 | 6976551 | ARM |
| 239 | 7412893 | ARM |
| 241 | 6896903 | BRAKE |
| 242 | 6551151 | SPRING |
| 243 | 6804792 | BRAKE |
| 244 | 6896895 | HOLDER,MOTOR |
| 245 | 6896852 | ARM |
| 246 | 6897251 | ARM |
| 247 | 6555483 | SPRING |
| 248 | 6897271 | ARM |
| 249 | 6897066 | GEAR,MODE |
| 250 | 6434861 | WORM WHEEL |

| SYMBOL-No | P-No | DESCRIPTION |
|---|---|---|
| 251 | 6555052 | SPRING |
| 252 | 7799012 | WASHER |
| 255 | 4508235 | GUIDE |
| 261 | 4131003 | PWB ASSY PRE AMP/HEAD SW |
| 271 | 7429631 | BRACKET |
| 272 | 7429641 | BRACKET |
| 273 | 7472125 | ARM |
| 274 | 7788348 | WASHER |
| 301 | 5571741 | MOTOR,CAPSTAN |
| 302 | 6804831 | CULUTCH BASE ASSY |
| 303 | 6351555 | BELT |
| 304 | 6897095 | ARM,FF/REW |
| 305 | 6434852 | RACK |
| 402 | 6804982 | BRACKET |
| 403 | 6804962 | BRACKET |
| 404 | 6896971 | WORM WHEEL ASSY |
| 405 | 6435571 | WORM |
| 406 | 4508221 | WORM SHAFT |
| 407 | 6804992 | BRACKET |
| 408 | 6896632 | ARM-SWITCH |
| 409 | 6302474 | SPRING |
| 410 | 6897041 | ARM-SWITCH |
| 411 | 7412583 | BRACKET-GEAR |
| 412 | 7449178 | HOLDER |
| 413 | 7449164 | BASE,CASSETTE HOLDER |
| 414 | 6896664 | HOLDER,CASSETTE (R) |
| 415 | 7428113 | HOLDER,STAY |
| 416 | 6820361 | ARM |
| 417 | 6897001 | ARM |
| 418 | 6556241 | SPRING |
| 419 | 6896673 | HOLDER,CASSETTE (L) |
| 420 | 7412944 | ARM |
| 421 | 6555772 | SPRING |
| 422 | 7412953 | SPRING |
| 423 | 6806531 | HOLDER,FRONT |
| 424 | 7580791 | SHAFT ASSY |
| 425 | 7428982 | BRACKET |
| 426 | 7794391 | WASHER |
| 501 | 5457962 | UPPER CYLINDER (CY-Z2N) |
| 502 | 5436317 | CYLINDER,LOWER(CY-Z2NC-L) |
| 503 | 5792635 | BRUSH,CYLINDER |
| 901 | 8699410 | SCREW(3X10) |
| 904 | 8691406 | 3X6 BT BIND SCREW |
| 905 | 7781582 | FALT SCREW-3MMDX10MM (BLACK) |
| 951 | 8691410 | SCREW |
| 952 | 8691308 | BT SCREW-2.6MMDX8MM |
| 953 | 8699408 | SCREW |
| 954 | 7781872 | SCREW-3MMDX8MM |
| 955 | 7773086 | SCREW |
| 956 | 8741414 | SCREW (3X14) |
| 957 | 8691412 | SCREW (3X12) |
| 958 | 8691408 | SCREW (3X8) |
| 959 | 8711406 | SCREW - 3X6 PAN HEAD SCREW |
| 960 | 8741412 | SCREW (B3X12) |
| 961 | 7785941 | SCREW |
| 962 | 8711404 | SCREW - 3X4 PAN HEAD SCREW |
| 963 | 7775581 | SCREW(M3X14) |
| 964 | 8741408 | SCREW (B3X8) |
| 965 | 8691308 | SCREW (2X8) |
| | | FOR ACCESSARIES |
| | 5614891 | REMOTE HAND SET |
| | 5857952 | CONNECTOR |

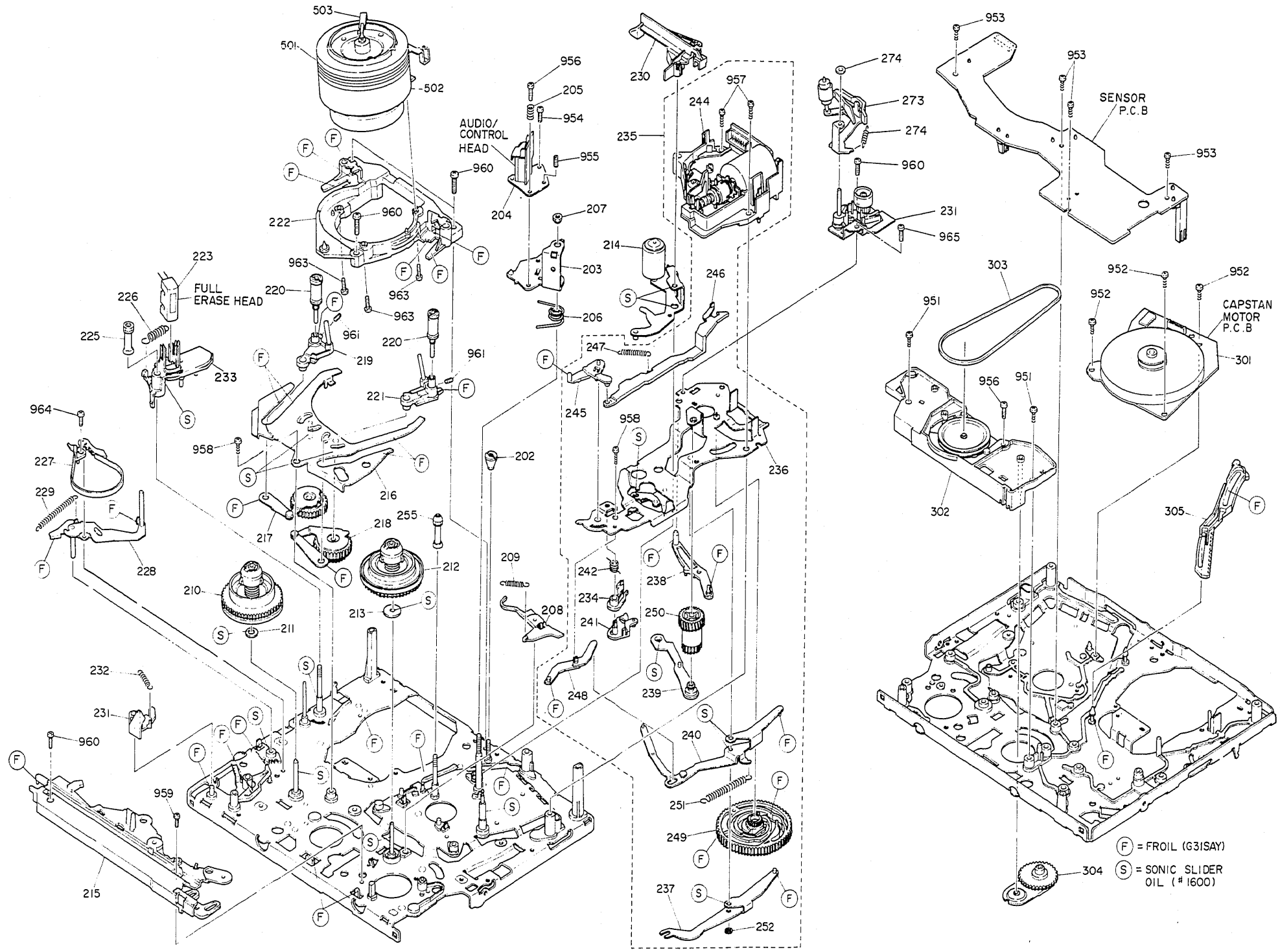


# EXPLODED VIEWS
## CABINET SECTION

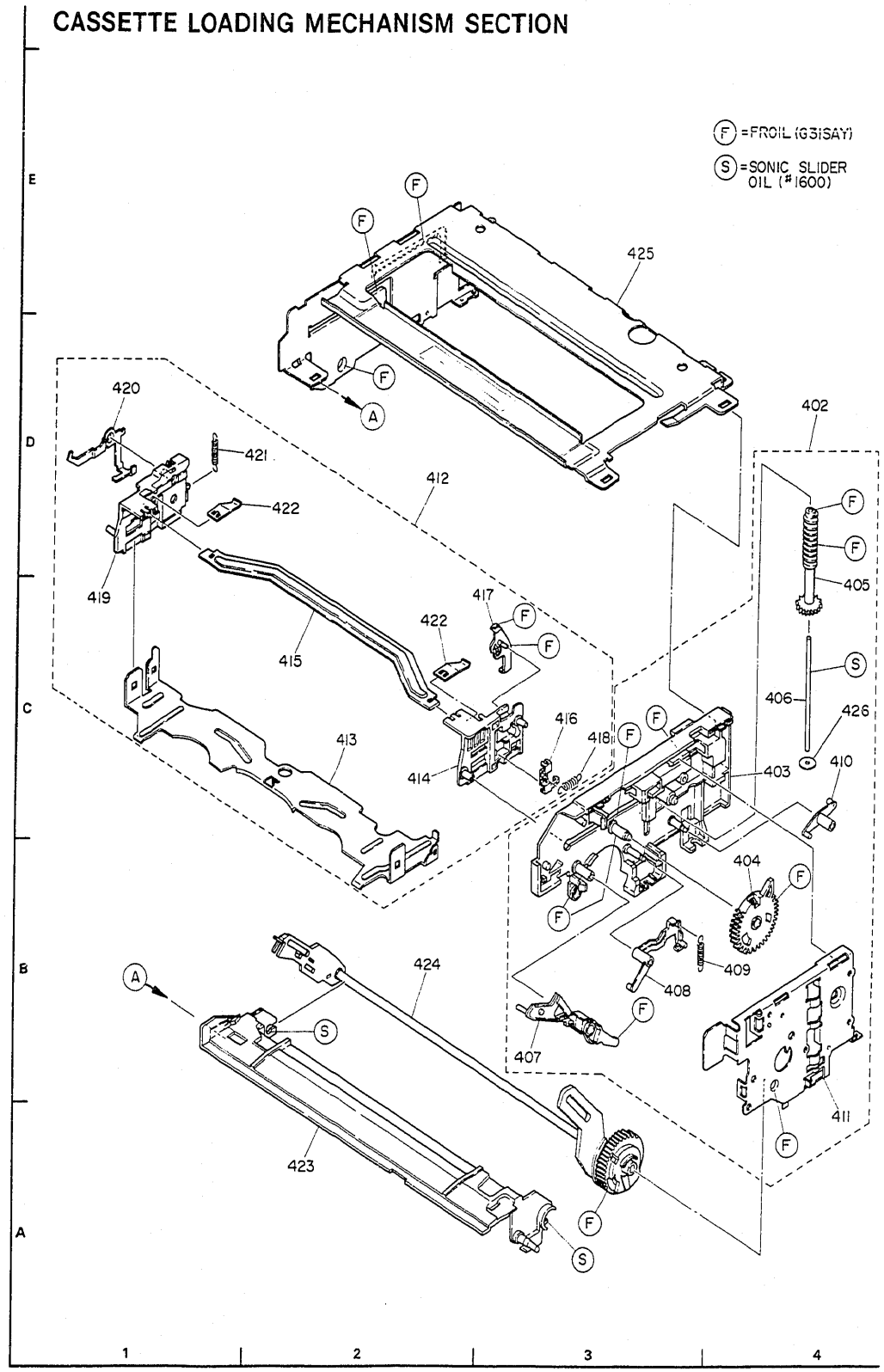


## CHASSIS (I) SECTION

## CHASSIS (II) SECTION



## CASSETTE LOADING MECHANISM SECTION



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